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WAR MACHINE

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A fully illustrated guide to Escort Vessels of World War II

WAR MACHINE

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Escort Vessels of World War 11

Of all the combatants in World War II, it was Britain and Japan who were most dependent upon a seaborne lifeline, and it was those nations to whom a threat to their merchant fleets was mortal. Obviously, means had to be established to protect the trade routes.

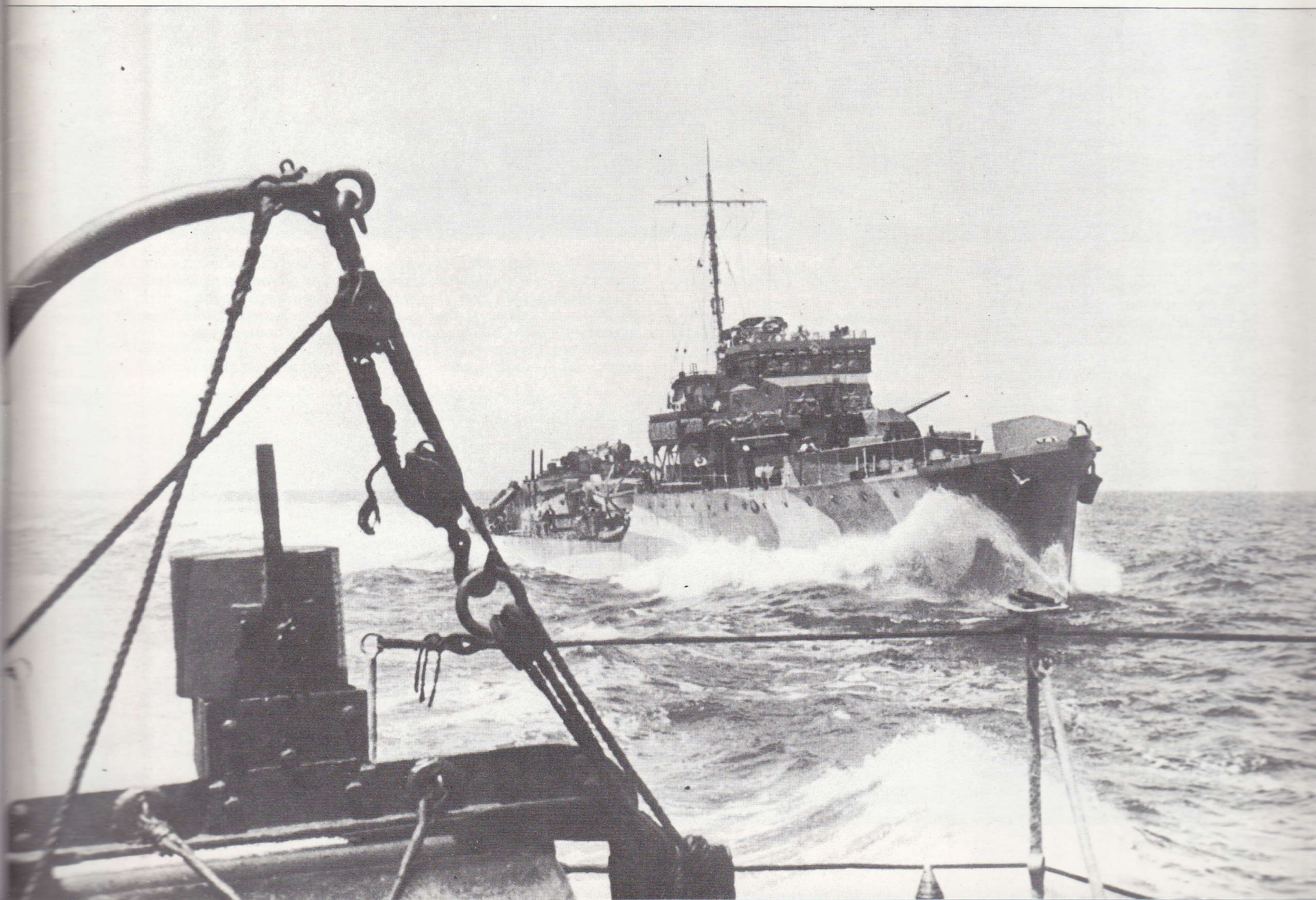
Commandant Duboc, *a Free French sloop of the 'Elan' class, is seen in Plymouth Sound soon after the fall of France. As with several French classes, the 'Elans' were pressed into service by both sides, this particular example being used on escort duty with the Royal Navy.*

Before World War I, theory had it that trade could run safely in defended maritime corridors; the fallacy of the argument and its replacement by escorted convoys was bought at the cost of millions of tons of merchant shipping. With the lesson learned, the British had the basis of a useful escort fleet in 1939. Initially, numbers were inadequate and the designs limited in both capability and endurance, but the organization existed to expand and improve rapidly. British convoys, particularly, had to face a variety of threats (high speed E-boat attacks on coastal routes, organized U-boat group assault in the Atlantic, and combined aircraft and surface attack on the Arctic and Mediterranean movements) and different escorts were required for each.

With too few anti-submarine (AS) ships and little experience, the escort forces were at first on the defensive. More and larger ships enabled the close escorts to be strengthened and enhanced in capability. Science improved both equipment and techniques. The formation of roving support groups and the rapid development of aircraft support allowed, firstly, for threatened convoys to have their escort groups reinforced rapidly and decisively and, secondly, the taking of the offensive against the U-boat by actually operating close astride its main route to and from its bases.

The aerial threat was never met by defeating the aircraft, only by land offensives which removed the aircraft bases or by satisfactory outcomes to campaigns that obviated the need to run the convoys themselves. Interestingly, the discredited early British arguments against convoys and, therefore, the need for 'defensive' escort ships in an essentially 'offensive' fleet, were carried on by the Americans and Japanese, neither of whom had had the benefit of bitter first-hand experience, and had neglected to learn from that of the British and paid dearly for their unpreparedness.

Britain's lifeline across the North Atlantic demanded good seakeeping and long range from her escorts. With the 'Hunt' class, however, designed as a Fast Escort Vessel (FEV), the Royal Navy got a vessel that was relatively heavily (and overambitiously) armed, without the range for Atlantic operations. The 'Hunts' nevertheless proved useful in the struggle around the coasts of Europe.



GERMANY

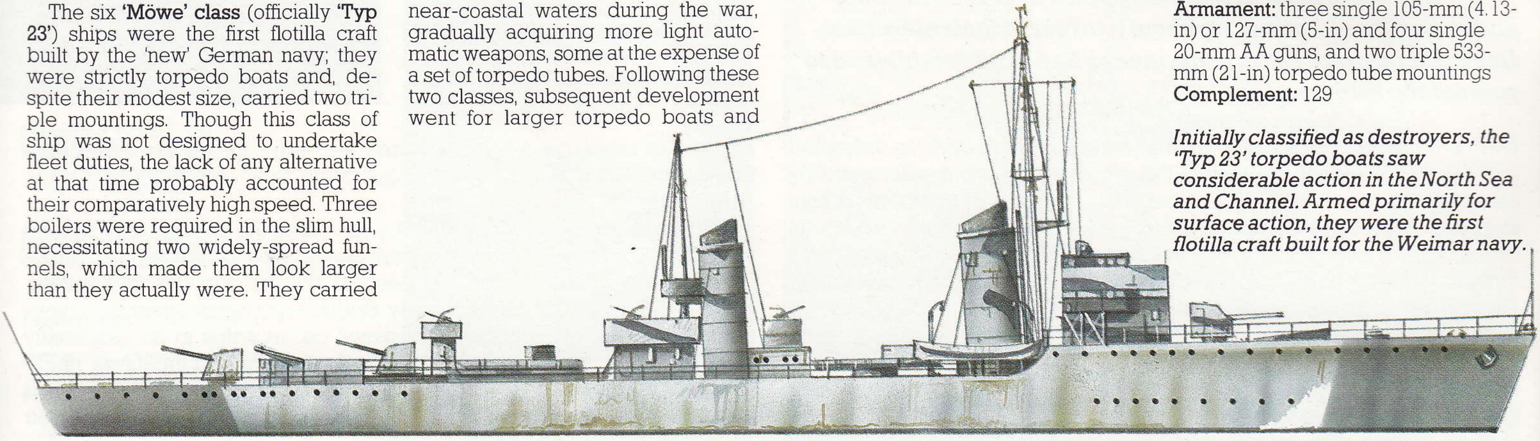
'Wolf' and 'Möwe' classes

Inasmuch as the Germans recognized that their mercantile marine would cease to function normally at the outbreak of war, they had little need of escorts in the same sense as the British. Nevertheless, the blockade of the German coast by submarine and mine entailed the covering of warships while the quite considerable volume of coastal traffic, (e.g. the iron ore trade from Scandinavia) needed protection without the tying down of major fleet units.

The six **'Möwe' class** (officially **'Typ 23'**) ships were the first flotilla craft built by the 'new' German navy; they were strictly torpedo boats and, despite their modest size, carried two triple mountings. Though this class of ship was not designed to undertake fleet duties, the lack of any alternative at that time probably accounted for their comparatively high speed. Three boilers were required in the slim hull, necessitating two widely-spread funnels, which made them look larger than they actually were. They carried three old, but effective 105-mm (4.13-in) guns which, together with the ambitious torpedo fit, brought up the topweight allowance to the extent that (unusually for the German navy) mines could not be carried in addition. While the 'Möwes' were still building, a second group of six, the slightly-enlarged **'Wolf' class** (**Typ 24**) ships were ordered. Though of the same calibre, their main armament was of an improved pattern.

The ships were heavily involved in near-coastal waters during the war, gradually acquiring more light automatic weapons, some at the expense of a set of torpedo tubes. Following these two classes, subsequent development went for larger torpedo boats and smaller S-boats. Neither of these types was viewed as an ideal escort, leaving the way clear for introduction of the specialist Geleitboote. All 12 became war casualties, no less than eight being sunk in the English Channel. Of these the ***Iltis*** and ***Seeadler*** were sunk in the Dover Strait during the night of 12/13 May 1942, torpedoed by British MTBs while covering the passage of the raider *Stier*.

Specification
'Wolf' class (as completed)
Displacement: 933 tons standard and 1,320 tons full load
Dimensions: length 93.0 m (305.1 ft); beam 8.7 m (28.5 ft); draught 2.8 m (9.2 ft)
Propulsion: two sets of geared steam turbines delivering 17151 kW (23,000 shp) to two shafts
Speed: 33 kts
Endurance: 5750 km (3,575 miles) at 17 kts
Armament: three single 105-mm (4.13-in) or 127-mm (5-in) and four single 20-mm AA guns, and two triple 533-mm (21-in) torpedo tube mountings
Complement: 129



Initially classified as destroyers, the 'Typ 23' torpedo boats saw considerable action in the North Sea and Channel. Armed primarily for surface action, they were the first flotilla craft built for the Weimar navy.

GERMANY

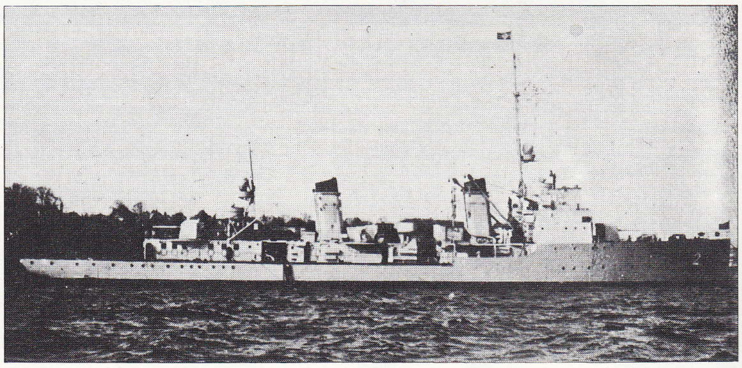
Geleitboote F1-F10

This group of 10 **Geleitboote** was completed by three yards in 1935-6 and, though officially termed 'escorts', they had a peacetime role in training in the Baltic and in general offshore duties. Again their wartime role was aimed at seeing larger warships through offshore barriers, for which they were given almost destroyer-like proportions and a high speed, with main parameters that had no equivalent in the Royal Navy. Handsome little ships, they looked rather more weatherly than larger German destroyers with plenty of freeboard forward and the angular bridge structure continued to the ship's sides by screens. Though the freeboard aft was low, the after 105-mm (4.13-in) gun was set on a deckhouse at the same height as that on the forecastle. They carried a good outfit of boats for their peacetime duties, these being handled by booms rather than davits. As they spent much time at low speeds they were equipped with anti-rolling tanks, not the passive, tuned variety but fitted with transfer pumps.

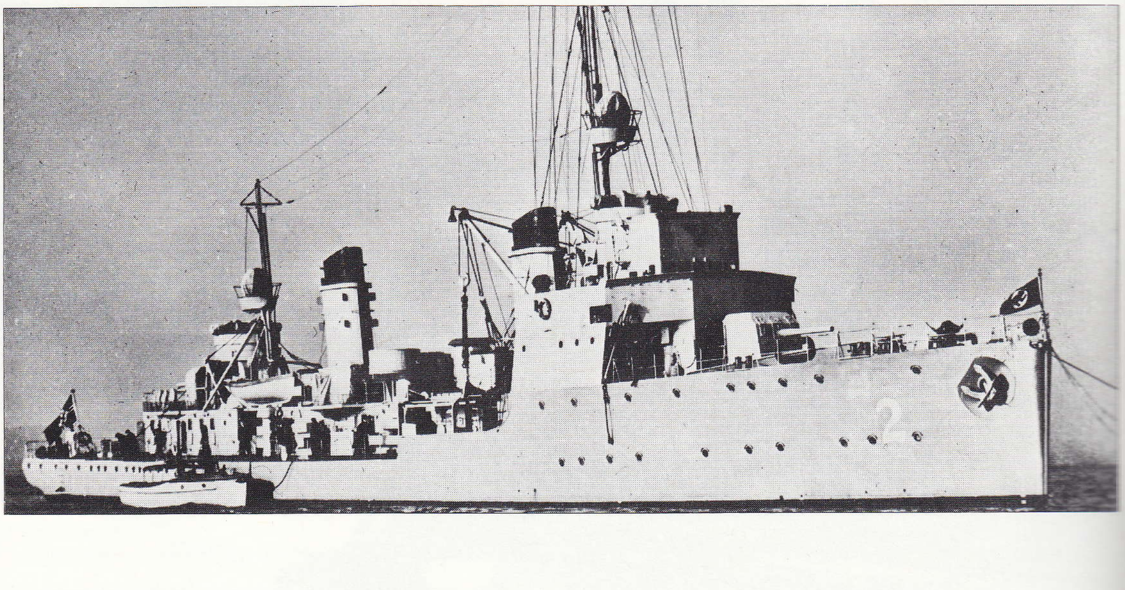
Their qualities must have left something to be desired for before the war, while still new ships, ***F1*** to ***F4*** and ***F6*** were lengthened and given raked bows. ***F2*** and *F4* were disarmed for use as auxiliaries but *F1*, ***F3*** and *F6* had the forecastle deck continued right aft to give a continuous high freeboard and much more accommodation. They were also named ***Jagd, Hai*** and ***Königin Luise*** respectively, the last name of which suggested an unlisted minelaying capacity, though they acted as command ships for minesweeper squadrons. As a result of their humble and largely non-involved status, the tide of war dealt kindly with them, only four being sunk.

An interesting series of 24 enlarged Geleitboote (*G1* to *G24*) was planned to follow on from both German and Dutch yards, but just *G1* was laid down, only to be destroyed on the stocks in an air attack in 1943. Like the 'F' series, they would have had a modest speed and no torpedo tubes, but had an enhanced surface armament, a capacity of 50 mines and, almost unbelievably for the date, a helicopter.

Specification
'Geleitboote' class (as built)
Displacement: 712 tons standard and 833 tons full load
Dimensions: length 76.0 m (249.3 ft); beam 8.8 m (28.9 ft); draught 2.5 m (8.2 ft)
Propulsion: two sets of geared steam turbines delivering 10440 kW (14,000 shp) to two shafts
Speed: 28 kts
Endurance: 2780 km (1,725 miles) at 20 kts
Armament: two single 105-mm (4.13-in), two twin 37-mm AA and four single 20-mm AA guns
Complement: 121



Above: In spite of their pleasant lines, the 'F' class of fleet escort were never really satisfactory. It may be that the class was largely an experiment in the building and operation of the new high-pressure steam turbine machinery.



Below: F2 as she appeared in 1938. The advanced propulsion machinery gave much trouble, and in spite of their destroyer-like lines the Geleitboote were poor sea boats. Most were lengthened forward and had a raked stem in consequence.

ITALY

'Spica' class

Like its German counterpart the Italian navy favoured the construction of diminutive destroyer-type escorts, usually described as 'torpedo boats'. Though a long series of related classes had been completed by the mid-1920s, the type had lapsed for a decade before being resumed with the 32-strong **'Spica' class**, laid down between 1934 and 1937. The design was influenced by that of the 'Maestrale' class destroyers then completing but, though superficially similar in overall profile, their single funnel lacked the massive trunking of that of the larger ships, serving as it did only one boiler room. The main armament consisted of 100-mm (3.94-in) guns of a new pattern with a respectable 16-km (10-mile) range. As these came only in single mountings, three were carried in the usual layout of one forward and two superimposed aft. Despite the fact that previous torpedo boats had been fitted with 533-mm (21-in) torpedo tubes, the 'Spicas' reverted to the earlier 450-mm (17.72-in) weapons of far inferior hitting power and range. For some odd reason these were initially single, sided mountings only, later exchanged for the more logical twin centreline type. As with most Italian ships they could lay mines but were also fitted for high-speed minesweeping, with conspicuous paravanes and associated gear right aft. Under the wartime construction programme a group of 42 improved 'Spicas' was also planned. Of these, known as the **'Ariete' class**, only 16 were laid down, the majority of them being completed by the Germans after the Italian capitulation.

Of the 32 'Spicas', 23 became war casualties and a pair were sold, perhaps oddly, to the Swedish navy. The ***Airone*** and ***Ariel*** were sunk together in October 1940 when, with others, they unwisely attacked a British cruiser force covering an early Malta convoy. Of the latter, HMS *Ajax* was instrumental in their sinking, damaging also the destroyers *Artigliere* and *Aviere*, the former of which was eventually lost while in tow. A year later another pair, the ***Aldebaran*** and ***Altair***, were lost in a minefield laid by the British submarine HMS *Rorqual* in the Gulf of Athens.

Specification

'Spica' class

Displacement: 795 tons standard and 1,020 tons full load

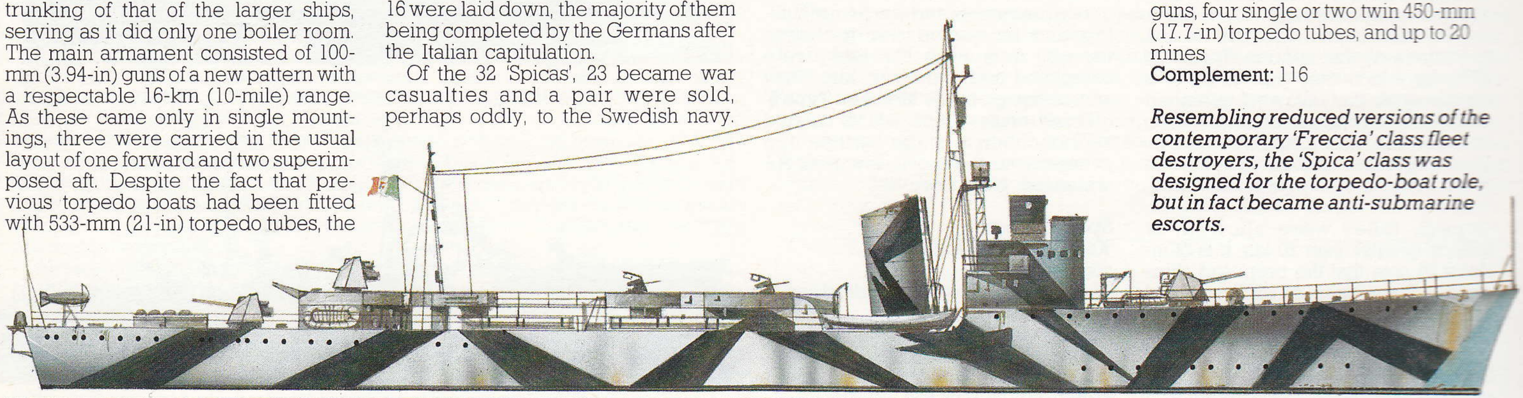
Dimensions: length 83.5 m (273.95 ft); beam 8.1 m (26.57 ft); draught 2.55 m (8.37 ft)

Propulsion: two sets of geared steam turbines delivering 14168 kW (19,000 shp) to two shafts

Speed: 34 kts

Armament: three single 100-mm (3.94-in), four twin and two single 20-mm AA and two single 13.2-mm (0.52-in) AA guns, four single or two twin 450-mm (17.7-in) torpedo tubes, and up to 20 mines

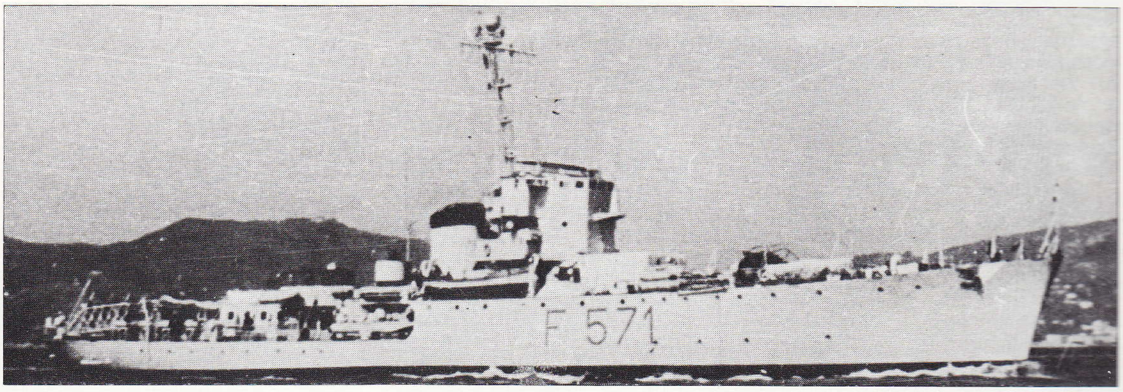
Complement: 116



Resembling reduced versions of the contemporary 'Freccia' class fleet destroyers, the 'Spica' class was designed for the torpedo-boat role, but in fact became anti-submarine escorts.

ITALY

'Gabbiano' class



Name-ship of a class intended to include some 60 vessels, Gabbiano displayed the typically fine lines of Italian marine design. Unlike their British counterparts, these corvettes did not have to be able to withstand winter in the North Atlantic.

With British submarines playing havoc on the vital supply route to North Africa, the Italians embarked in 1942 on an ambitious programme of **'Gabbiano' class** corvette construction. This type of ship was new to the Italian fleet and, in British terms, may be said to equate to the 'Flowers' where the 'Spicas' equated to 'Hunts'. There the resemblance ended, however, for where the British ships were stubby and robust, the Italian ships were slightly longer but very much narrower in the beam. Not having to face North Atlantic winters they were able to place speed higher in their priorities. Even so, their seakeeping qualities were adequate, with a long forecastle of high freeboard that early 'Flower' skippers would have envied.

The great contrast was in propulsion. The British ships with their whaler origins had a pronounced trim by the stern to give adequate submergence for the single large-diameter screw, driven by a steam reciprocating engine. On the other hand the Italians, with a good industrial base for small diesel and petrol engines, favoured the former of these. Twin-shaft propulsion was adopted to take advantage of established marques of engine, at the same time achieving redundancy, improving manoeuvrability and, with smaller-diameter propellers, allowing a full 1 m (3.3 ft) less draught, an important factor in the shallow and increasingly mine-ridden Mediterranean. The price was more complex construction and extremely noisy ships with the diesels effectively secured to the hull framing and the necessarily high-speed propellers a source of cavitation. This was recognized as a necessary drawback in the interests of volume production and, very interestingly for the date, each shaft could be turned by a low-power electric motor for stalking submarines. This permitted not only silent manoeuvring but also an improved performance from the ships' own indifferent sonar. The 60-ship class (of which only 42 were completed after launching in 1942-3) defeated the usual Italian lettered pendant system, the ships taking numbers. Few were completed in time to be used in earnest by the Italians; many were taken by the Germans, who did. War losses amounted to 20.

Specification

'Gabbiano' class

Displacement: 670 tons standard and 740 tons full load

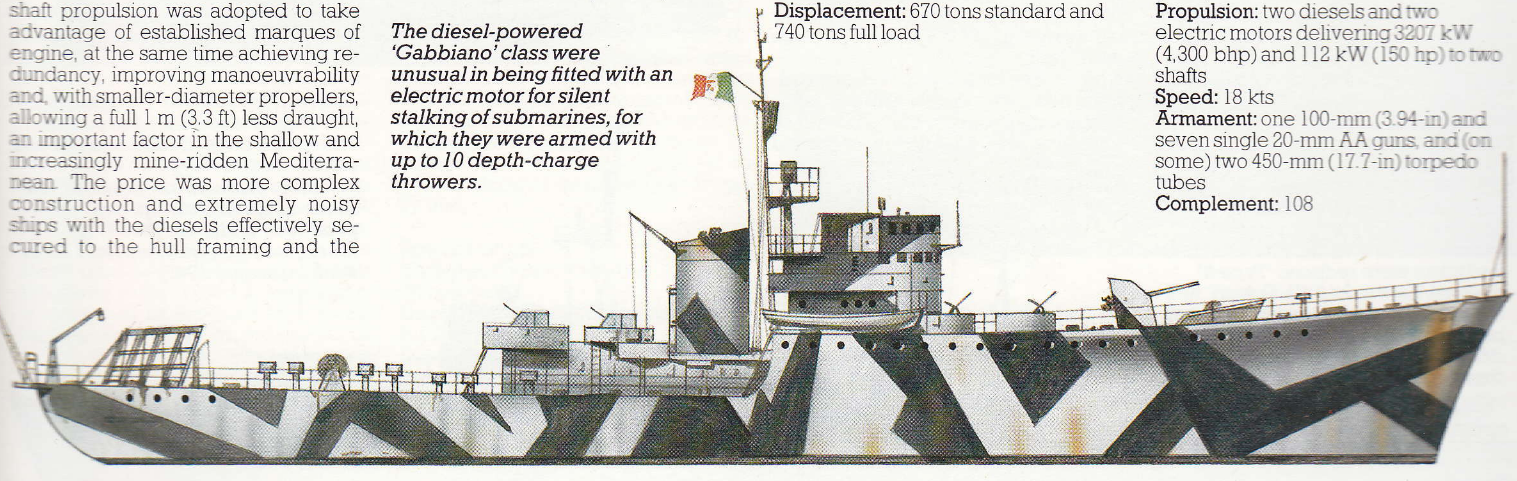
Dimensions: length 64.4 m (211.29 ft); beam 8.7 m (28.54 ft); draught 2.53 m (8.3 ft)

Propulsion: two diesels and two electric motors delivering 3207 kW (4,300 bhp) and 112 kW (150 hp) to two shafts

Speed: 18 kts

Armament: one 100-mm (3.94-in) and seven single 20-mm AA guns, and (on some) two 450-mm (17.7-in) torpedo tubes

Complement: 108



The diesel-powered 'Gabbiano' class were unusual in being fitted with an electric motor for silent stalking of submarines, for which they were armed with up to 10 depth-charge throwers.

JAPAN

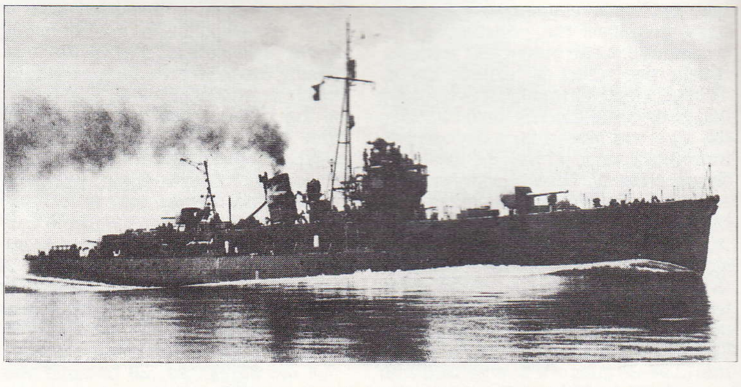
Kaibokan 'Type A' and 'Type B'

Kaibokan is a generic title for the main body of Japanese escorts. The term means, roughly, 'coast defence ship' rather than 'escort' (no less inaccurate than the terms 'frigate' and 'corvette' misapplied by the British). Though the need for such ships had been recognized as far back as the early 1930s, their essentially 'defensive' image resulted in their being continually cut from the building programme of an Imperial Japanese Navy that was obsessively 'offensive', and bent on a short maritime war that would render a convoy system unnecessary.

The draft plans were set to the limitations of the London Treaty of 1930, by which they had to be of a simple type that allowed unlimited construction. Displacement had to lie between 600 and 2,000 tons and no guns of greater calibre than 155 mm (6 in) were to be carried, nor more than four exceeding 76 mm (3 in). No torpedo tubes were allowed, or speeds greater than 20 kts. It is of interest to note that the proposed ships were to have been of 1,200 tons and break the rules by shipping four 127-mm (5-in) weapons.

Not until the 1937 programme were four **'Type A'** prototypes firmly ordered, and even these were to a reduced specification as part of their funding was diverted. Their functions were listed as fishery protection, minesweeping and (lastly) convoy escort. Of robust but complex construction, their short forecastle and continuous superstructure set the style for the whole series. A single, low-angle 120-mm (4.72-in) gun was sited on the forecastle, with two others superimposed aft. All had good arcs. Three of the four were war losses.

Just months before hostilities developed, a totally inadequate order was placed for 30 ships, namely 14 **'Modified Type A'** (**'Etorofu' class**) ships, of which nine were lost, and 16 of improved and enlarged **'Type B'** (**'Mikura' class**) ships. The latter were of simpler construction, carried DP guns in one single and one twin mounting and increased depth-charge capacity from 36 to 120. Eight were completed and five were lost. They were followed by 33 **'Modified Type B'** (**'Ukuru' class**) ships which carried simplification a stage further and strengthened the previously weak AA armament. Nine were lost.



Seen on the Inland Sea in about July 1940, Shimushu *was the first of a class of four general-purpose escorts built between 1938 and 1941, and served as prototype to all Japanese wartime escort programmes. Unlike many of her successors,* Shimushu *survived the war, to be handed to the USSR.*

Specification

'Kaibokan Type A' class (as completed)

Displacement: 860 tons standard and 1,020 tons full load

Dimensions: length 77.7 m (254.9 ft); beam 10.0 m (32.8 ft); draught 3.05 m (10.0 ft)

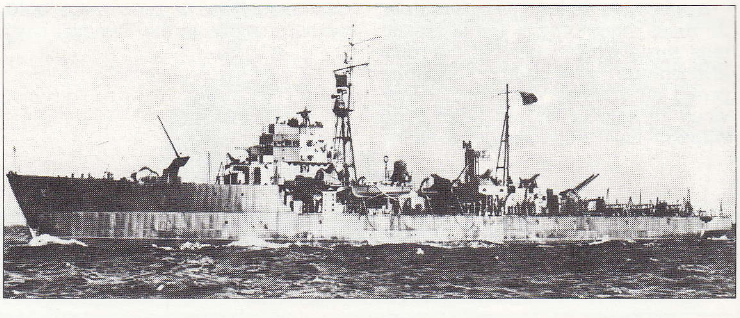
Propulsion: two geared diesels delivering 3356 kW (4,500 bhp) to two shafts

Speed: 19.5 kts

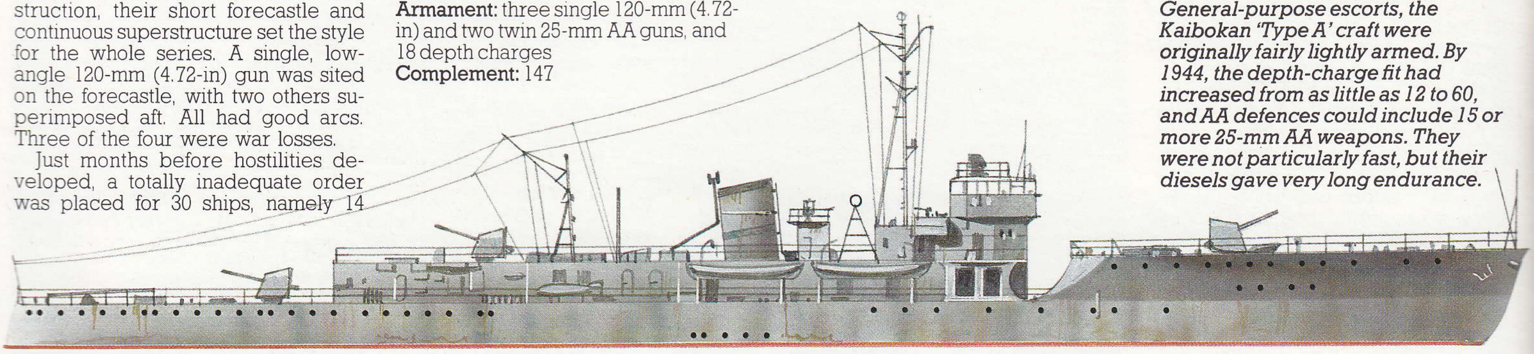
Endurance: 14825 km (9,210 miles) at 16 kts

Armament: three single 120-mm (4.72-in) and two twin 25-mm AA guns, and 18 depth charges

Complement: 147



The improved Kaibokan 'Type B' Shisaka *leaves Osaka in December 1944. Simpler, but faster and more heavily armed than her predecessors, she was handed to China after the war. Re-named* Hui-An, *she may still be in service today.*



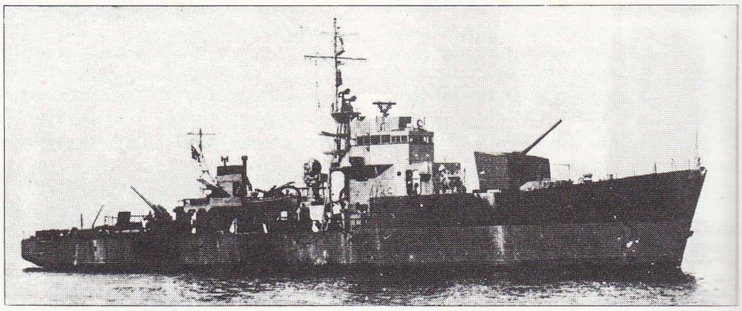
General-purpose escorts, the Kaibokan 'Type A' craft were originally fairly lightly armed. By 1944, the depth-charge fit had increased from as little as 12 to 60, and AA defences could include 15 or more 25-mm AA weapons. They were not particularly fast, but their diesels gave very long endurance.

JAPAN

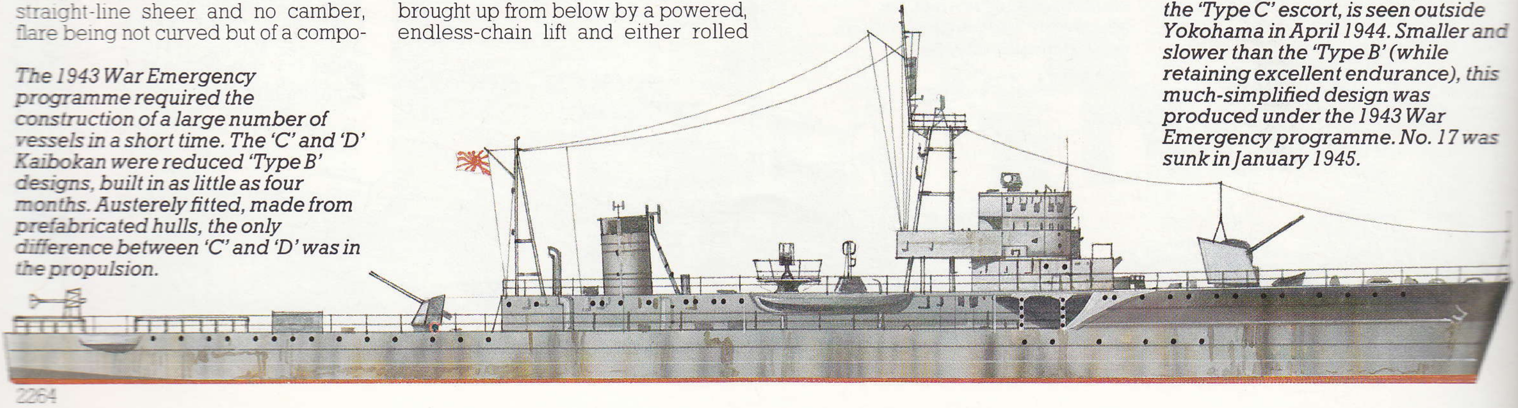
Kaibokan 'Type C' and 'Type D'

The *Kaibokan* **'Type C'** programme ran virtually parallel with that for the 'Modified Type Bs'. Sufficient priority for resources and steel needed to be made available for escorts to counter the alarming loss rate in merchant ships. A two-gun ship of smaller size, the 'Type C' dispensed with every possible complication and was designed for welded construction (reintroduced after major failures in the 1930s) so that smaller yards could handle them. The forecastle had a straight-line sheer and no camber, flare being not curved but of a composite angle whose discontinuity followed the line of the maindeck. Propulsion was a problem in that the earlier type of diesel could not be produced in sufficient quantity and alternatives with less than half the power were installed, though still producing an acceptable speed of over 16 kts. Orders reached 132, but only 53 were completed in 1943-5, and 30 of these were lost.

They retained the novel arrangement whereby depth charges were brought up from below by a powered, endless-chain lift and either rolled



Above: Kaibokan No. 17, typical of the 'Type C' escort, is seen outside Yokohama in April 1944. Smaller and slower than the 'Type B' (while retaining excellent endurance), this much-simplified design was produced under the 1943 War Emergency programme. No. 17 was sunk in January 1945.



The 1943 War Emergency programme required the construction of a large number of vessels in a short time. The 'C' and 'D' Kaibokan were reduced 'Type B' designs, built in as little as four months. Austerely fitted, made from prefabricated hulls, the only difference between 'C' and 'D' was in the propulsion.

Defeat of the U-boat

The island nations of Japan and the United Kingdom had the most to lose from the submarine threat. For all their aggressive spirit, the Imperial Navy could not cope with the US Navy and its submarine blockade, and it was left to their old teachers in the Royal Navy to get to grips with the problem.

An interesting paradox of the war years was that the ships and their machinery became ever simpler, to suit series production, while their equipment became ever more complex. Fundamentally, this equipment was required to detect the enemy, destroy him and protect the ship from him. For the better part, the term 'enemy' was synonymous with 'enemy submarine' which, having started ahead, lost the lead and never quite regained it.

The British, having developed 'Asdic' (later, sonar), greatly over-rated its performance. This was proved to deteriorate rapidly in real seaway and, as the equipment covered only a sector ahead of the ship and depth charges were dropped from the after end, contact was always lost at a crucial point in an attack. A considerable 'dead time' then elapsed with the ship having to get to the drop point and the depth charges themselves having to sink. With experience, U-boat skippers could detect and exploit this weakness, particularly as structural improvements allowed them to dive more deeply. If two anti-submarine ships were in company, one could 'illuminate' the target continuously and direct the attack of the second.

Ahead-throwing weapons, such as Hedgehog and Mousetrap, enabled a ship to drop a pattern on a submerged target while it was still firmly in the beam. Simpler than a depth charge, a Hedgehog bomb sank quickly but needed to hit its target to detonate, though this drawback was reduced by the considerable 'spread' achieved with two dozen bombs. Improved sonars then enabled a target's depth to be measured accurately, making possible the Squid, which fired a small spread of three large bombs with hydrostatic fuses.

German U-boat group tactics demanded a great volume of radio traffic, both between each other and to the centralized command ashore. High-frequency direction-finding (Huff-Duff) took advantage of these transmissions, one escort getting a bearing and two getting an accurate 'fix'.

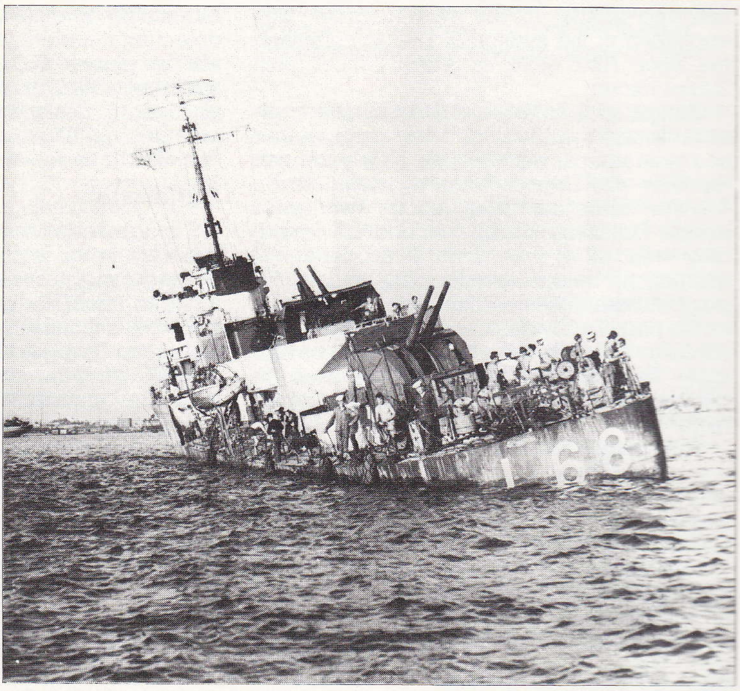
Early U-boat aces were successful through using their superior speed and small silhouette to attack a convoy on the surface at night. This also offset the escorts' advantage of Asdic, their only answer at first being 'Snowflake' illuminants, but by 1941 radar was becoming more general and defeated this tactic.

Escorts improved rapidly in numbers, experience and quality, with techniques being developed for close co-operation with the U-boat's other arch enemy, aircraft.

The submarine responded with radar detectors, floating decoys to create spurious radar echoes, submerged decoys emitting clouds of bubbles to confuse Asdics and, most deadly, acoustic torpedoes. These homed onto the cavitation noise of a ship's propellers, blowing her stern off. Initial countermeasures included reducing speed to an impossibly-low 7 kts, a measure superseded by the crudely-scientific 'Foxer', a towed device of clanging metal bars.

The introduction of the 'snort' improved a submarine's survivability but the high-speed hull, had it come earlier, could have been a war winner, with the fast frigate and the helicopter needing to be developed a full decade earlier than, in fact, they were.

The Atlantic lifeline was vital to the survival of Britain, and in the early stages of the battle it looked as though the war was lost to the U-boat. The reintroduction of convoys, together with ASW advances and the introduction of air cover, eventually saw the battle turn decisively the other way.



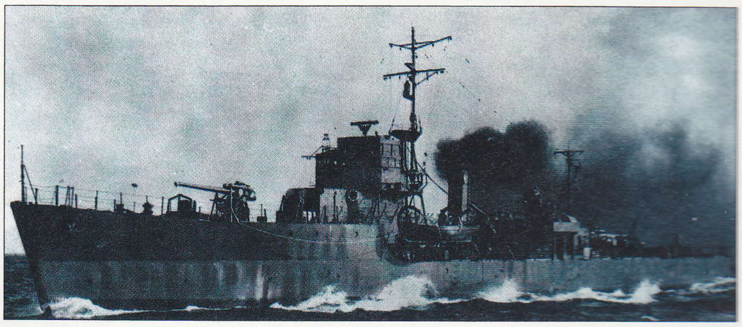
The battle of the Atlantic was not at all one-sided, as memories of flaming ships falling out of convoy so eloquently demonstrate. There were also occasions when the hunter became the hunted, as this 'Hunt' class escort shows. Hit in the stern by a German torpedo, she limps back into harbour.

down an inclined plane over the transom or fed on rollers to 12 throwers, set conveniently at deck level with their firing tubes set below deck. Ingenious, it was a triumph of quantity over quality, for better sonar and training would have placed fewer charges more effectively.

Even the diesels for the 'Type Cs' ran into production problems, resulting in the design of a steam-turbine driven **'Type D'**, a single-shaft ship whose two boilers exhausted via a distinctive, spindly stack, set farther forward than in previous practice. The steam plant had poorer economy than the diesel, so the 'Type Ds' were slightly enlarged to accommodate extra bunkers, despite which their radius of action was inferior. Building times were four to six months, but no sooner were they being commissioned than the increasing shortage of heavy oil for bunkers demanded that they be converted to coal firing (which must have caused acute fuel transfer problems). The effort was, however, largely academic as US submarines finally cut the convoy route to the Dutch East Indies. With the *Kaibokan* programme now largely superfluous, building ceased to allow a concentration on craft that were designed to contribute to the final struggle for the home islands. 'Type D' orders amounted to 143, of which 63 were completed and 27 lost.

Specification

'Kaibokan Type C' class (as completed)
Displacement: 745 tons standard and 810 tons full load
Dimensions: length 67.5 m (221.46 ft); beam 8.4 m (27.56 ft); draught 2.89 m (9.5 ft)
Propulsion: two geared diesels giving 1417 kW (1,900 bhp) to two shafts
Speed: 16.5 kts
Endurance: 12045 km (7,485 miles) at 14 kts
Armament: two single 120-mm (4.72-in) and two triple 25-mm AA guns, one 80-mm (3.15-in) mortar, and 120 depth charges
Complement: 125



The 'Type D' Kaibokan no. 8 is seen outside Nagasaki in 1944. Steam turbine-powered versions of 'Type C', they were faster but of reduced endurance. Initially oil-fired, many were converted to coal burning after the sea routes to the oilfields of the East Indies were cut.

Walker: U-boat hunter supreme

The U-boat threat to Britain's survival came closest of all the Axis efforts to bringing Britain to her knees. In spite of the experiences of 1917, merchant losses rose inexorably in the first years of the war, and it was only by unceasing effort and scientific development that the menace of the wolfpack was defeated. Many gave their lives to that struggle, and prominent among them was F.J. Walker.

Atop the bridge of HMS Starling*, Captain Walker supervises a U-boat hunt by the 2nd Support Group early in 1944. His casual (and characteristic) attire of old pullover and leather jerkin of dubious origin is in contrast to that of his officers.*

Some thrive in the peacetime navy; others need a war to develop their true potential. Captain Frederick Walker was one of the latter. He first went to sea as a cadet in 1913 and, between the wars, specialized in anti-submarine warfare. This field was then less than glamorous, a factor which, coupled with spells in capital ships (which he hated, and said so), found him in 1939 a commander with no prospects of further promotion.

For the first two years of World War II Walker fretted ashore while enemy U-boats sank well over 4 million GRT of merchant shipping. In a deteriorating situation he endeavoured to persuade authorities that his best place was at sea and finally, to his own surprise, was appointed in the autumn of 1941 to command the sloop HMS *Stork* as Senior Officer, 36th Escort Group.

Groups such as these existed to give close cover to convoys, the ships being kept together as a team as far as was possible. Newly-formed, the 36th was Liverpool-based, having seven 'Flower' class corvettes led by two faster sloops. Following a brief 'working-up' period, they went off to war, their SO's operational instructions being typically pithy and to the point, stressing the need for personal initiative on the part of individual captains to attack without delay and with whatever means were available. They ended: 'No officer will ever be blamed by me for getting on with the job in hand.'

The group's first task was to escort an OG convoy to Gibraltar, a passage in which the only enemy was the weather. The return run was with HG76 and was a very different affair. It sailed on 14 December 1941 into an expected U-boat concentration, and to cope with this the convoy was accompanied for the first time by an escort carrier, the pioneer HMS *Audacity*, and three locally-based destroyers. Over the next few days, for the loss to the convoy of two ships, the enemy lost five submarines.

First sighting was by an aircraft, 32 km (20 miles) distant and illustrating the value of the presence of a carrier. Walker's impulsive nature was then evident by his taking five ships of the 'close' escort to deal with it, a prolonged absence that was eventually justified only by the successful outcome.

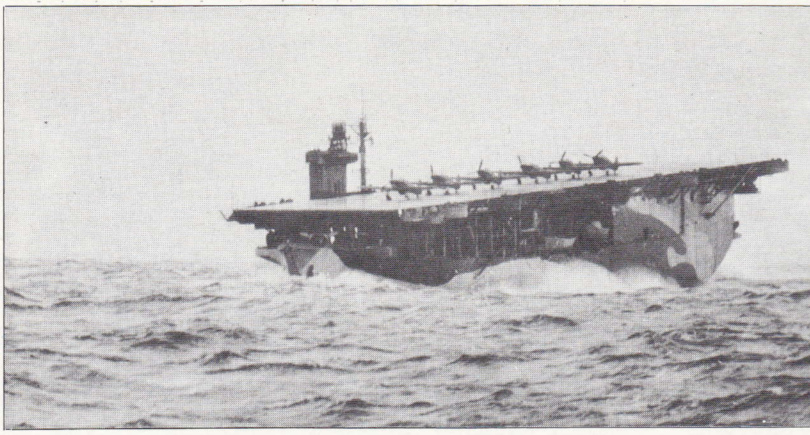
A second U-boat was sunk by two of the Gibraltar destroyers on the next day but, in the darkness before the following dawn, one of these was in turn sunk by torpedo. Walker himself was quickly on the scene in the *Stork* and demonstrated his unique 'nose' for a U-boat by running down its anticipated line of retreat, detecting it and blowing it to the surface with just two passes. Too close to depress his guns sufficiently, Walker engaged in a sort of nautical dogfight, finally sinking the submarine by ramming, putting his thin-skinned sloop into dock for three months as a result.

'Buttercup'

Though radar was now more commonly available to the escorts, Walker liked to discourage night surface attack by U-boats through a sudden and massive local use of 'Snowflake' illuminants, an operation he called 'Buttercup' It worked but had the disadvantage of silhouetting the convoy nicely for any prowler on the opposite wing. As the carrier could not operate her aircraft at night, her safest night station was in the centre of the convoy but, late on 21 December, she was out to one side, just where Walker ordered a 'Buttercup' following the torpedoing of a merchantman. The *Audacity* was then herself torpedoed and sunk, Walker blaming himself for the loss. Despite this, the overall result was seen as a major defensive victory, with lessons to be learned. Walker was invited to discuss his views on anti-submarine warfare at the highest level. He made four salient observations of which two, curiously, could be questioned.

Firstly, nobody doubted his contention that the *Audacity* had proved the case for a carrier presence. His recommendation for an inner and outer screen for a convoy was impossible

HMS Starling *in 1944. A modified 'Black Swan' class escort sloop (classed as a frigate post-war), the type carried 110 depth charges (and could carry 50 more at the expense of 40-mm Bofors ammunition). The six sister ships of Walker's group thus possessed formidable ASW firepower.*



In spite of Walker's scepticism, the escort carrier proved its worth in the U-boat war, providing mid-Atlantic air cover to the convoys. Walker was not convinced at the time, however, and tended to look on the escort carriers as nice juicy bait to entice U-boats into the arms of the 2nd Support Group.

with the escorts available (though even these could have been used more effectively if larger convoys had been accepted earlier) but was, in effect, later adopted by the availability of support groups to reinforce escort groups that were hard-pressed. He strongly defended 'Buttercup', though it could backfire badly on occasion. Lastly he supported escorts leaving their charges by day to carry out 'offensive lunges' at the enemy, a risky business that aroused controversy.

Despite criticism of the last point, Walker did not hesitate (in June 1942) to take two of only four escorts covering HG84 over 80 km (50 miles) to pursue a contact for seven hours. The following night, with the small screen not yet fully back on station, three U-boats sank five ships in a co-ordinated attack. Though no submarines had been destroyed, despite Walker's unflagging industry, the attack was considered officially to have been satisfactorily contained.

Walker was shortly afterward promoted Captain, taking over the 2nd Support Group of six 'Black Swan' class sloops, headed by HMS *Starling*, which was crewed largely by 'old Storks'. Five of these groups were operating by the spring of 1943, their function being to join any threatened convoy and allow more U-boats to be hunted to the death without denuding the convoy of its escort.

This freedom suited Walker's style admirably. On 1 June 1943 a 'Huff-Duff' radio intercept warned of a U-boat and gave its bearing; the six sloops headed in this direction in line abreast at 6.4-km (4-mile) spacing. This deliberate sweep was rewarded, with the *Starling* gaining first sonar contact and thus the privilege of the first attack.

When this produced no apparent result, Walker sent three of his ships to patrol the 'outfield' escape routes while he and the remaining two delivered a 'special', steaming abeam in close order while laying a dense carpet of depth charges. The target, *U-202*, survived 76 charges by virtue of going exceptionally deep. Up top, the group sat back to wait, harrying the German from time to time. In his element, Walker was in his usual working gear, a tattered woolly jumper overlaid by a leather jerkin of uncertain origin, a half-eaten sandwich in one hand and the microphone to the loud hailer in the other. Inevitably coming up for air during the night, the enemy was duly gunned down. Her destruction would never have been possible with the group responsible also for a convoy.

It was in mid-1943 too that the Admiralty embarked on a combined air and surface blitz on U-boats traversing the Bay of Biscay, to and from their French bases. On 24 June the 2nd Support Group opened the season with two U-boats before tea. With five sloops trolling along in search formation, the *Starling* unexpectedly had a contact close aboard and immediately laid a pattern on it. To everybody's surprise a U-boat suddenly staggered to the surface in her wake. Between them the ships could muster 30 101.6-mm (4-in) guns and most of these opened up at the hapless submarine. Leaving nothing to chance, however, Walker reversed course and took his ship through an enthusiastic friendly barrage, ramming the enemy, which rolled under the keel, and dropping a valedictory shallow depth-charge pattern for good measure. Again Walker had a bent ship, leaking, lacking sonar but lucky to be still complete with propellers and rudders. He took temporary command of HMS *Wild Goose* when, later, the *Wren* put up another target. Another deep one, she was attacked by the Walker tactic of using one ship to pinpoint her while the remainder were directed in slow speed and, therefore, silent approaches, giving the enemy no warning. This was followed up by a rolling barrage (a 'plaster') of 50 charges from two ships. That did it.

Although in July 1943 alone 37 U-boats were destroyed by all agencies, 16 of them between Ushant and Gibraltar, the 2nd Support Group unusually accounted for only two. Friendly fighter cover was now often required to prevent harassment by Luftwaffe fighter-bombers and glider bombs. The acoustic torpedo was also making an appearance.

In January 1944, with seven 'kills' so far to their credit, six sloops of the group left for the central Atlantic, accompanied by two CVEs. Following his experience with the *Audacity*, Walker was not too keen on carriers, viewing them mainly as a useful bait with which to entice U-boats into attacking distance. This proved to be the case when, two days out, the *Wild Goose* (the group's best sonar ship) flushed a U-boat tracking HMS *Nairana*. A 60-charge 'plaster' from her and the *Starling* accounted for the submarine without further ado.

Three sinkings

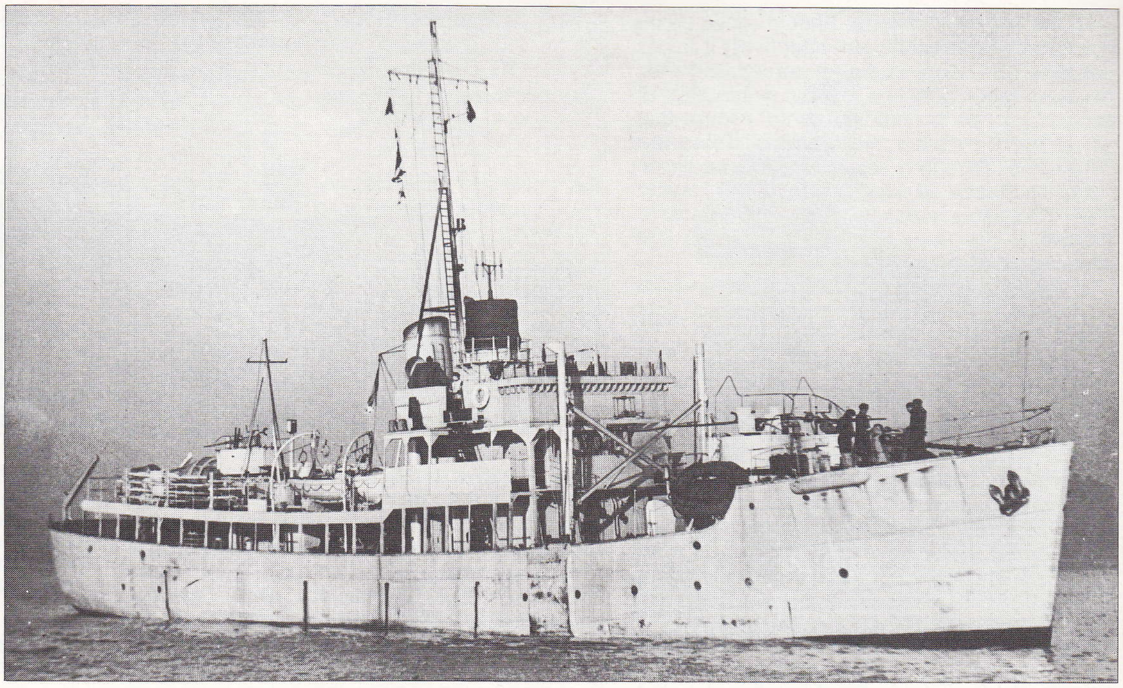
On 9 February three U-boats were sunk in 15 hours. The group had left the carriers and covered a point where up to 22 submarines were threatening a series of passing convoys. Two were located in sequence on the surface in the early hours, and each dived and then succumbed easily to immediate attack. The third required prolonged tracking and patience. A day later, several hours' pursuit in poor sonar conditions accounted for another. The last was the result of a Walker 'hunch' that the logical place for U-boats at daybreak would be just astern of a convoy. One was. It was sunk and gave the group a tally of six boats in 19 days. A useful recruit had been HMS *Magpie*, which had a Hedgehog but, on the debit side, the *Woodpecker* lost her stern to an acoustic torpedo and foundered while in tow.

By July 1944, the group's total 'bag' had risen to 16 but Walker was feeling the strain. The Normandy landings had seen him with responsibility for 40 anti-submarine ships in the western English Channel. He was proud of his ability to stay on watch far longer than his younger officers but endless wet nights on open bridges had taken their toll. Already a CB, he was awarded a third bar to his DSO, given added seniority and slated for flag rank. It was not to be. On 7 July he went ashore from the *Starling* at Liverpool for some much-needed leave and two days later he was dead. A stroke, occasioned by overwork, struck him with a finality that no enemy had matched. He was not quite 48 years old.

February 1944, and aboard Starling *Captain Walker verbally encourages the sloop HMS* Woodpecker *into the attack. It was on this voyage that the 2nd Escort Group sank six U-boats in 19 days. The success was not without loss, however, with* Woodpecker *being sunk by an acoustic torpedo.*

UK

'Isles' class


HMS Shillay *is seen in February 1945. Though the trawler hull gave the type good seakeeping and endurance, it could never be said to have had a sparkling performance. They were easily built, however, and in quantity (a total of 168 in four related classes).*

The UK's large fishing fleet in 1939 provided the Royal Navy with a ready source of ships and trained crews, not only for the obvious purposes of the Auxiliary Patrol, minesweeping and harbour defence but also, in the case of the large distant water trawlers, of convoy escorts at a time when these were in short supply. The speed of such vessels was limited but both endurance and seakeeping were adequate, and they were commonly employed on the Arctic convoy route in the early days.

From its experience in 1914-8 the Admiralty had forewarning of its needs and had already formulated plans for trawler construction at yards that were familiar with them and which were, in many cases, too small for the building of regular escorts. The 27 ships of the 'Hill', 'Military' and 'Fish' classes were all produced by one yard and had the very pretty lines of the distant water trawler. Half a dozen 'Lakes' from Smith's Dock were still almost pure whale-catchers. Most, however, were of a design developed from the prototype HMS *Basset*, completed by Robb's in 1936. This ship, though having an obvious trawler-type hull, had in addition a high raised forecastle and the bridge and funnel sited well amidships, leaving a short well deck forward, a long superstructure and a usable quarterdeck. With minor modifications, particularly in the height of the bridge structure, the type went into volume production, first as the **'Tree'**, **'Shakespeare'** and **'Dance' classes**, then as the **'Isles' class**, which became the best-known group. Altogether, these four groups comprised 218 trawlers. The 'Isles' class numbered 168 units built between 1940 and 1945 (130 in the UK, 22 in India and 16 in Canada).

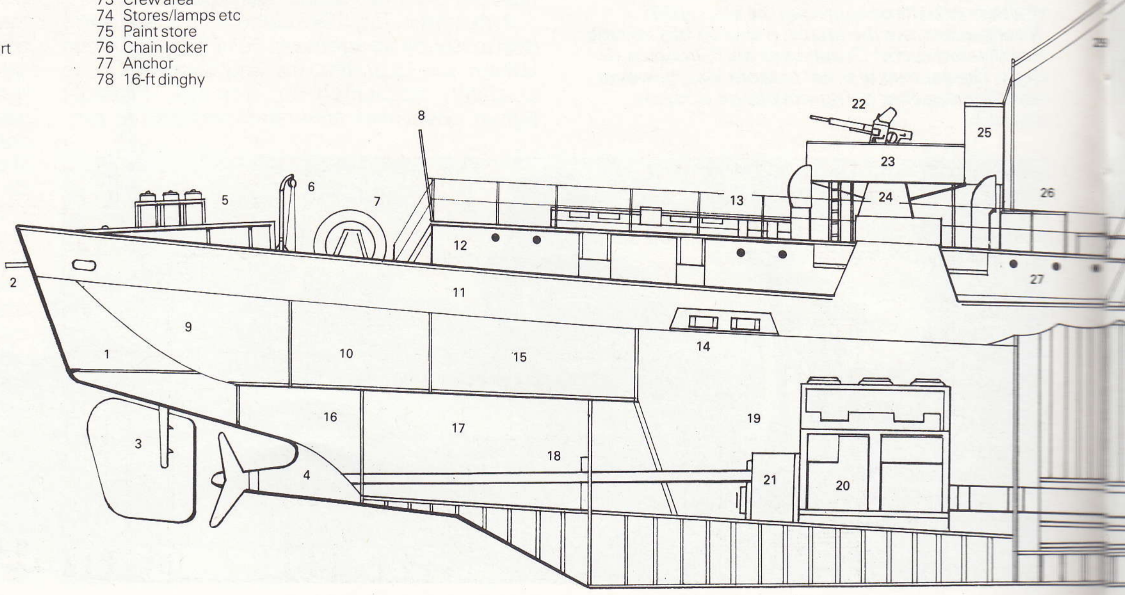
Though many were equipped for anti-submarine work, their sonars were not generally very effective and few had radar. With only 11 or 12 kts speed, dropping depth charges on a shallow target could be an advantage, while the pursuit of a submarine on the surface was clearly impossible, the submarine having a greatly superior speed in addition to out-gunning the average trawler's 12-pdr. The object was to force a submarine down, where it would lose touch with a convoy. Many of these 'rugged coal-burners' were sold out to commercial owners after the war to make good their grievous losses, though their layout was unsatisfactory for trawling until modified. Twelve 'Isles' were lost in the war.

Specification

'Isles' class (as designed)
Displacement: 545 tons standard
Dimensions: length 44.2 m (145.0 ft); beam 8.4 m (27.5 ft); draught 3.2 m (10.5 ft)
Propulsion: one triple-expansion steam engine delivering 634 kW (850 ihp) to one shaft
Speed: 12 kts
Armament: one 12-pdr, and three single 20-mm AA guns, and depth charges
Complement: 40

'Flower' class escort cutaway drawing key

1 Waterline
2 Ramp
3 Rudder
4 Single screw
5 Depth charge racks
6 Davit
7 Lifeline cable reel
8 Jack staff
9 Steering gear compartment/minesweeping store
10 Stores/lobby
11 Solid bulwarks
12 Aft galley
13 Engine room skylight
14 Stored depth charges along deck
15 PO mess
16 Aft peak
17 Engineer's stores
18 Single shaft
19 Engine room
20 Triple expansion 1700-kW (2,880-hp) engine
21 Reduction gear
22 2-pdr pom-pom
23 Pom-pom platform
24 Platform support
25 Guncrew shelter and ready ammunition
26 Snowflake locker
27 Handrail
28 Ladder
29 Wireless aerial
30 Funnel casing
31 Ventilator
32 Boiler casing
33 Carly raft
34 No. 1 boiler room
35 No. 2 boiler room
36 Admiralty drum boiler
37 Oil fuel in wing tanks
38 Double bottom
39 Funnel uptake
40 Bulkhead
41 Fresh water tank
42 Galley
43 Foremast
44 Lookout
45 Access ladder
46 Office for Type 271 radar
47 Searchlight
48 Twin 20-mm machine-guns
49 Bridge
50 Compass house
51 Asdic hut
52 Chart house
53 Ready use locker for 4-in ammunition
54 4-in Mk 10 gun
55 Gun shield
56 Breakwater
57 Depression rail
58 Semtex walkway on port side
59 Wooden fore deck
60 Anchor windlass
61 Handrail
62 Side plating
63 Stores/lobby/spirit store
64 Wardroom
65 Cabins/stokers' mess
66 Oil fuel tank
67 Reserve feed water tank
68 Asdic compartment
69 Fresh water tank
70 Magazine
71 RF wireless
72 Crew sleeping area
73 Crew area
74 Stores/lamps etc
75 Paint store
76 Chain locker
77 Anchor
78 16-ft dinghy



UK

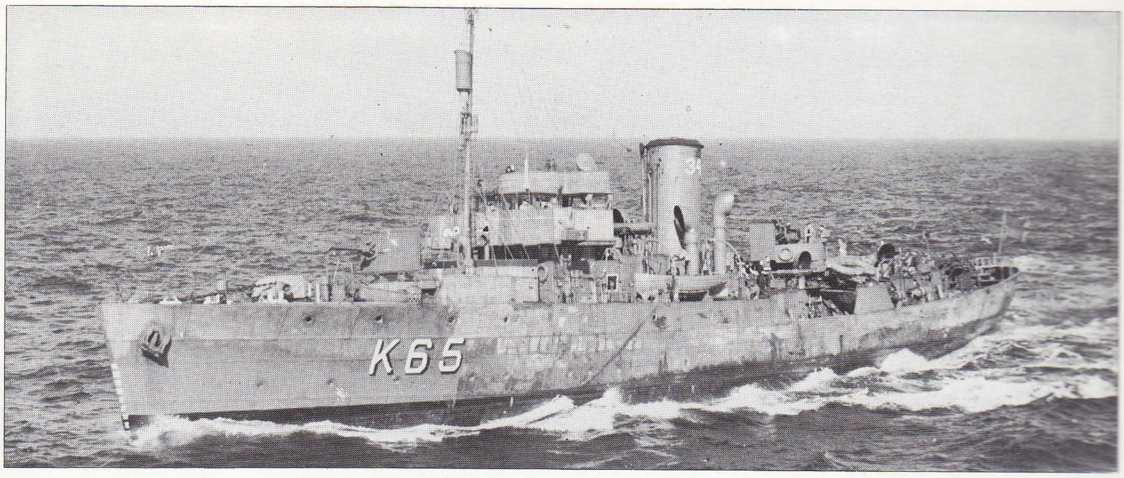
'Flower' class

Possibly because of their homely names or their rather unwarlike appearance, the units of the **'Flower' class** (145 built in the UK and 113 in Canada for launch in 1940-2) came to be regarded by the British as the archetypal escort ship. Though they made their reputation in the early days of the Battle of the Atlantic, they were not really suited to the job, the type being developed primarily as a coastal escort fitted for minesweeping. This, however, would seem to be at variance with the fact that the design was based on that of a commercial whale-catcher, a hullform meant to survive the worst of the weather in the forbidding Southern Ocean. It was the rapid escalation of the North Atlantic convoy war and a general shortage of escorts that forced these little ships into ocean work. They were superb seaboats but, being so short, were horribly lively and wet in the deep ocean, exhausting the best of crews within days, though refuelling at sea kept them out for longer. It was the limitations that convinced the Admiralty that the larger frigate was the answer.

The 'Flowers' were business-like ships whose ancestry could be seen in the hull, with its pronounced sheer, strong flare and cutaway forefoot. Early units had a short forecastle with the single mast stepped forward of a mercantile-style bridge structure, but most of these were subsequently modified to the layout of the later **'Modified Flower' class** ships (included in the totals above). These had the forecastle extended aft to the funnel, increasing accommodation and improving seaworthiness, particularly with respect to reducing wetness in the waist.

Machinery was purposely kept simple for mass production and operation by rapidly-trained personnel, the four-cylinder triple expansion engine taking steam from two Admiralty cylindrical single-ended boilers. The ships were, at that time, rare in the Royal Navy in being single-screw types.

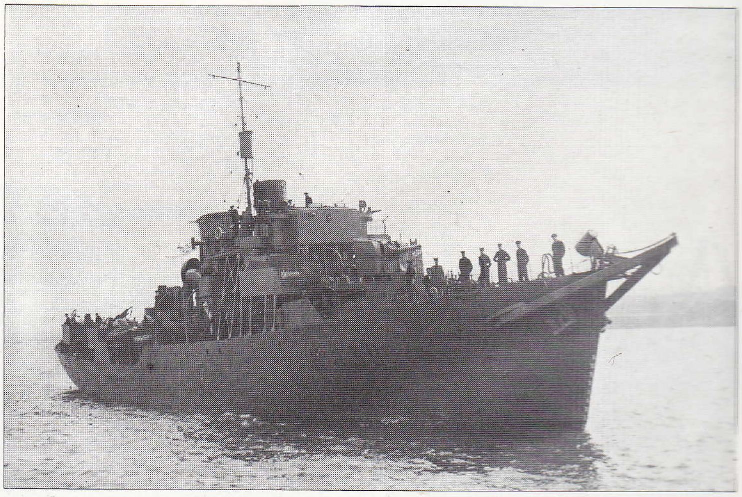
All had an old pattern 101.6-mm (4-in) gun on a 'band stand' forward, but the original inadequate AA outfit of machine-guns rapidly gave way to a 2-pdr pom-pom and as many 20-mm Oerlikons as could be 'come by'. Later ships, incorporating all modifications, certainly looked more 'pusser' and many, surprisingly, went on to serve in a mercantile role after the war. Also built in Canada, they served under a variety of Allied flags, including that of the USA when its need was greatest in 1942. Total wartime losses were 31.



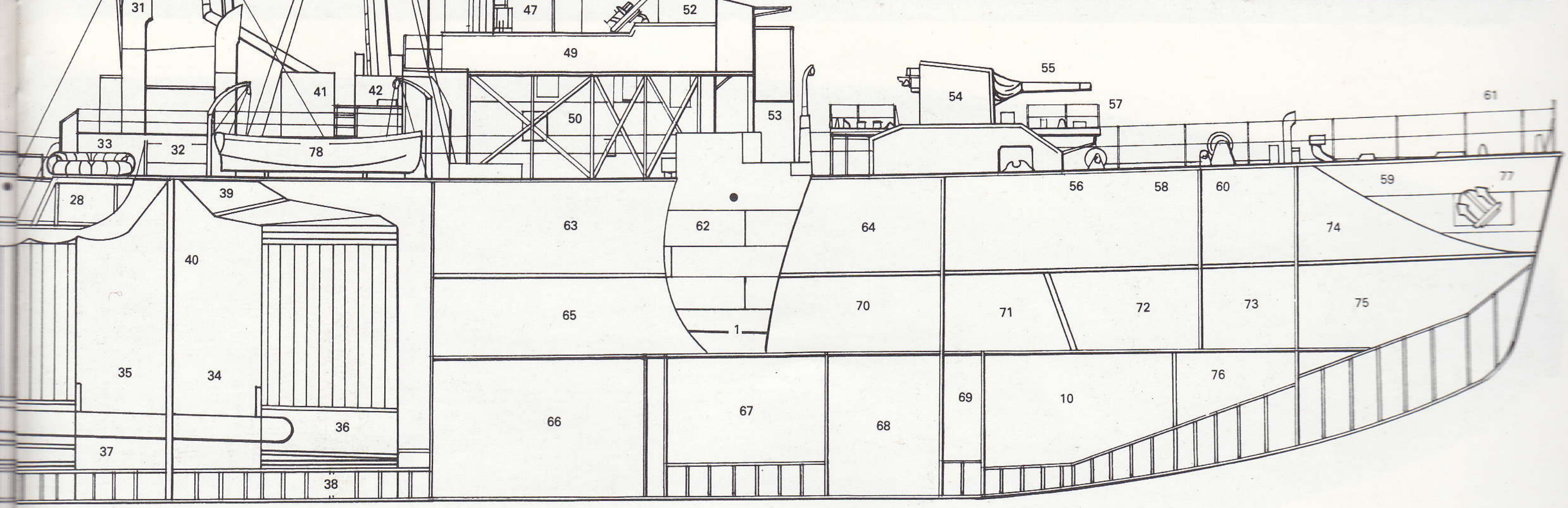
HMS Myositis *at sea displays the battered appearance that constant Atlantic exposure made inevitable. Based upon a commercial whaler hull, the 'Flower' class filled the gap in British escort capacity early in the war, until replaced by new frigates.*

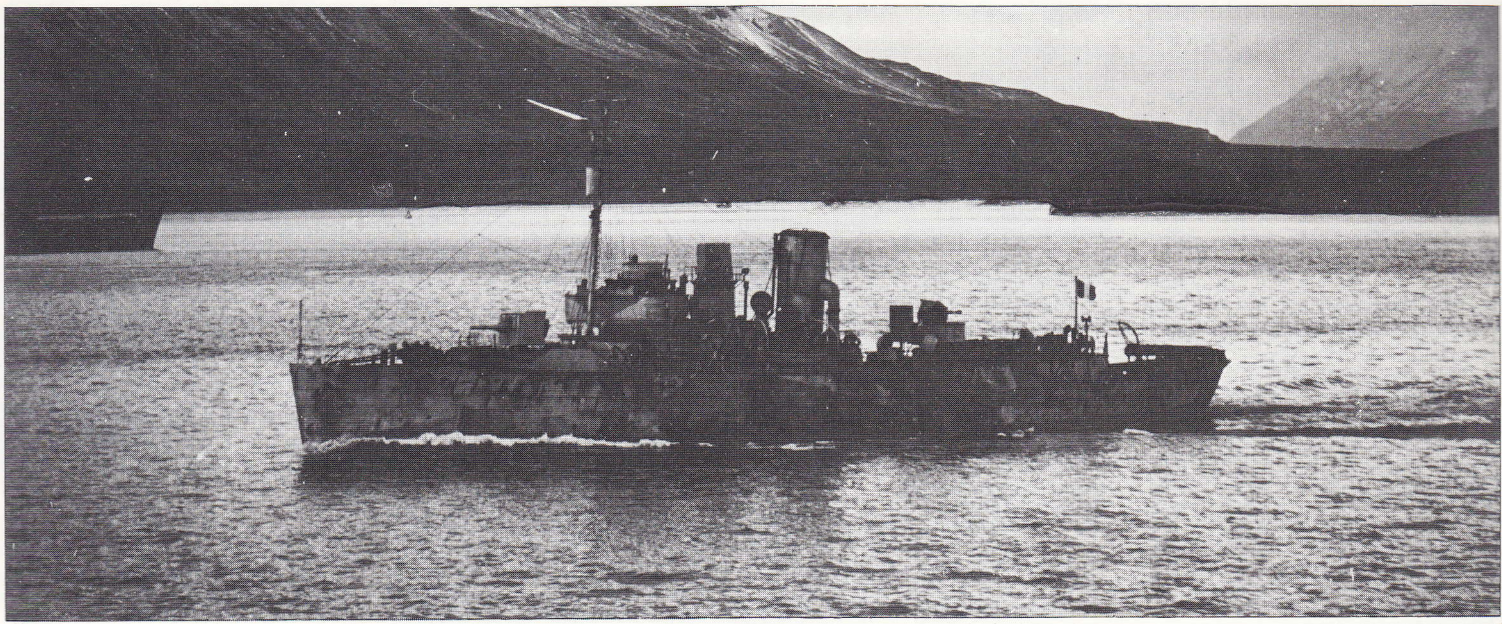
Specification

'Flower' class (original specification)
Displacement: 940 tons standard and 1,160 tons full load
Dimensions: length 62.5 m (205.1 ft); beam 10.1 m (33.1 ft); draught 3.5 m (11.5 ft)
Propulsion: 4-cylinder triple-expansion steam engine delivering 2051 kW (2,750 ihp) to one shaft
Speed: 16 kts
Endurance: 6400 km (3,975 miles) at 12 kts
Armament: one 101.6-mm (4-in) gun, one 2-pdr or one quadruple 12.7-mm (0.5-in) AA gun, and depth charges
Complement: 85 maximum

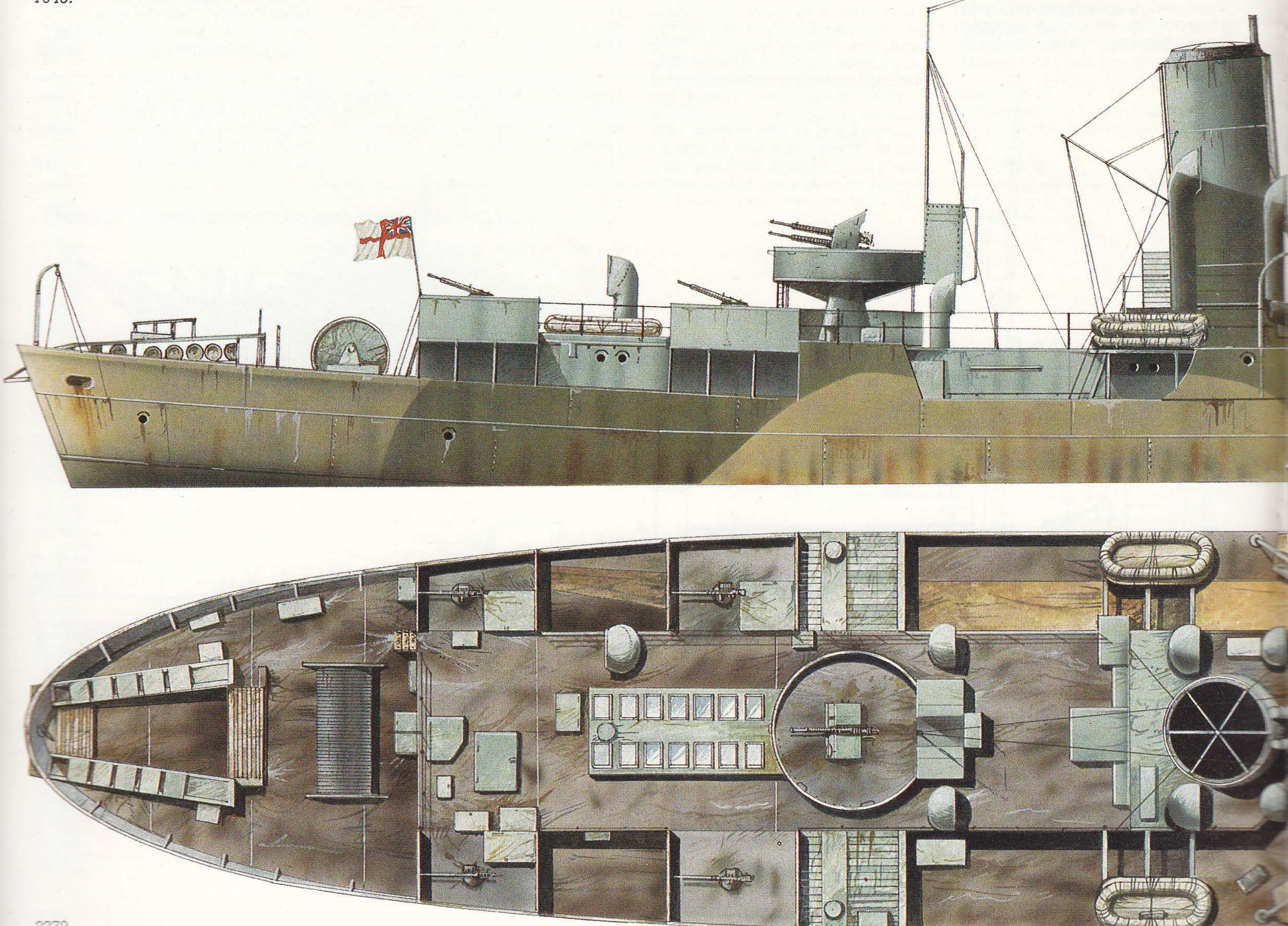


HMS Lotus *is seen before her 1942 transfer to France as the* Commandante d'Estienne d'Orves. *She is fitted with minesweeping gear, which was to be a secondary task after the designed role as a coastal escort. Only the severe shortage of ocean escorts saw the class employed in the North Atlantic.*

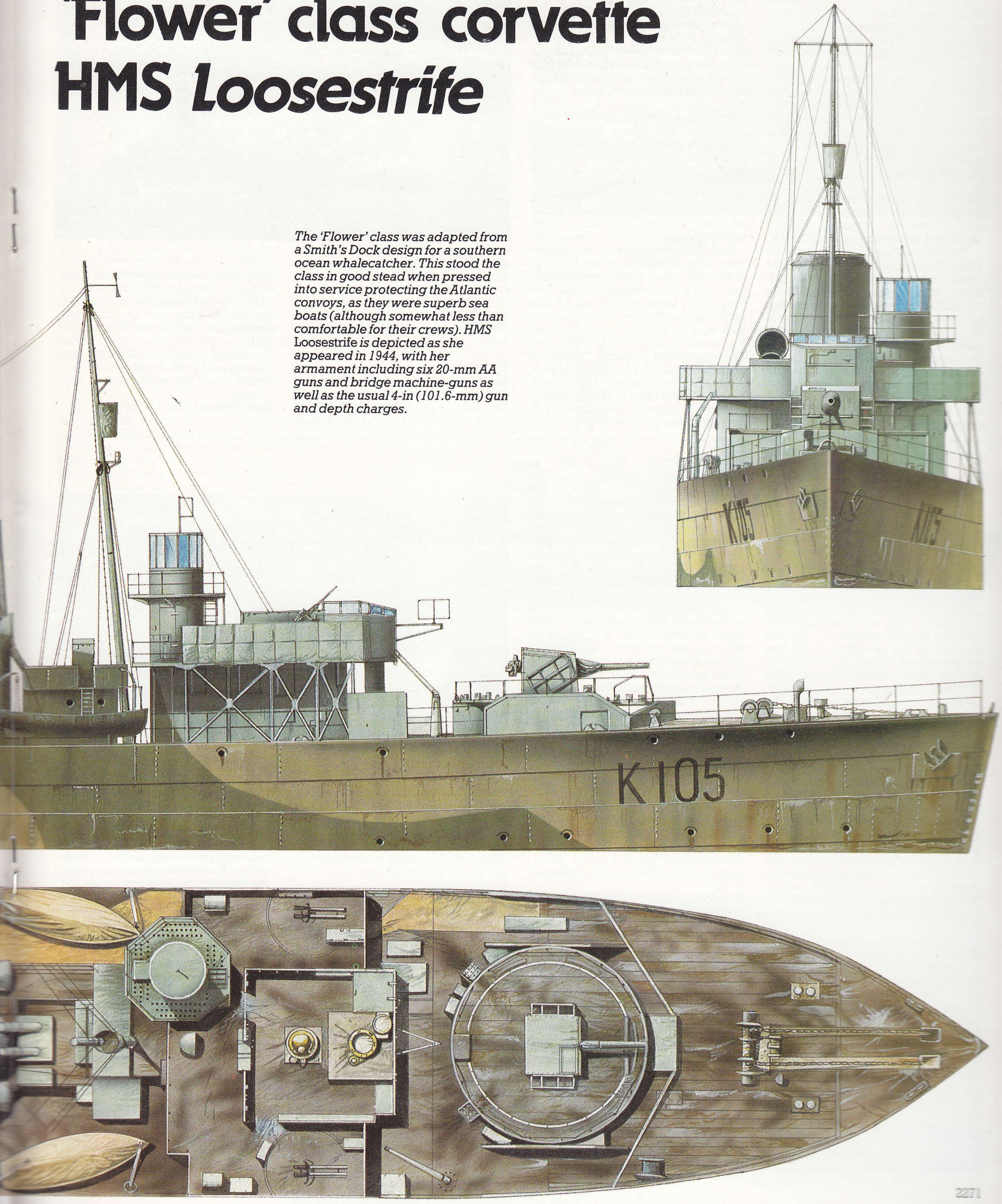




Aconit started life as HMS Aconite, *before transferring to the Free French Navy in 1941. She is seen entering an Icelandic fjord in the middle of an Atlantic convoy run. As is usual with wartime escorts, she presents a sadly battered appearance, but she continued to serve into 1945.*



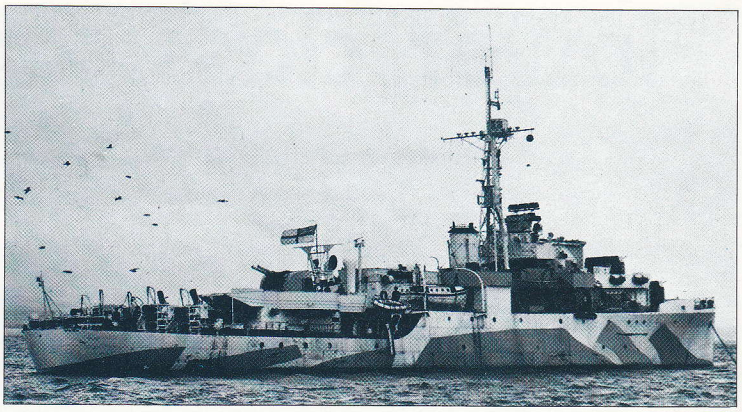
'Flower' class corvette HMS *Loosestrife*



The 'Flower' class was adapted from a Smith's Dock design for a southern ocean whalecatcher. This stood the class in good stead when pressed into service protecting the Atlantic convoys, as they were superb sea boats (although somewhat less than comfortable for their crews). HMS Loosestrife is depicted as she appeared in 1944, with her armament including six 20-mm AA guns and bridge machine-guns as well as the usual 4-in (101.6-mm) gun and depth charges.

UK

'Black Swan' class


Fine submarine hunters, the modified 'Black Swan' class were at their most effective in the Battle of the Atlantic. This is HMS Amethyst, *seen in her wartime colours. Some years later she was to be at the heart of the 'Yangtse Incident', suffering damage during the Chinese civil war.*

The powerful little ships of the **'Black Swan' class** (13 built) had little in common with the remainder of the Royal Navy's sloops, most of which were later regarded as ocean minesweepers or simply patrol ships. Earlier units were certainly fitted with minesweeping gear, though under what circumstances such expensive and useful ships were expected to go looking for mines is not clear; at the same time the space and topweight margin consumed by this gear detracted considerably from the design's anti-submarine capacity. It was only with the **'Modified Black Swan' class** (24 built) that this equipment was finally landed, enabling the ships to become extremely efficient dedicated submarine hunters.

The origins of the 'Black Swans' went back to HMS *Enchantress*, which had been launched in 1934. Though capable of minesweeping, the ship had a gun armament comparable with that of a fleet destroyer. The third of the class, HMS *Bittern*, differed in being completed in 1938 with three of the new high angle 101.6-mm (4-in) mountings and a prototype fin stabilizer system. This arrangement was so promising that the three follow-on 'Egret' class units, on very little increase in dimensions, were completed with four such mountings, which was definitely over-ambitious. The 'Black Swans', very similar in appearance, were slightly larger with a useful quadruple 2-pdr in the Y position, from which it was later removed to improve quarterdeck layout, and as the close range armament elsewhere was beefed-up by the improving availability of 20-mm and 40-mm weapons.

The first impression of the apearance of the 'Black Swans' was the mass of superstructure, which was probably in accord with the desire to produce an easy roll to improve them as AA gun platforms. Oddly, they did not fare too well against aircraft, four being sunk by bombing out of a total of five lost. The reason was probably that, unlike the similarly-armed 'Hunts', they were slow and less nimble. They were, therefore, little used in the Mediterranean, making their name in ocean warfare with later units being able to ship over 100 depth charges and a Hedgehog split to flank B mounting. Most, logically, were sent to the Far East in 1945. Best known ships of the class were Walker's HMS ***Starling*** and HMS ***Amethyst*** of the 1948 'Yangtse Incident'.

Specification

'Black Swan' class
Displacement: 1,300 tons standard
Dimensions: length 91.3 m (299.5 ft); beam 11.43 m (37.5 ft); draught 2.59 m (8.5 ft)
Propulsion: two sets of geared steam turbines delivering 2685 kW (3,600 shp) to two shafts
Speed: 19.5 kts
Endurance: 14825 km (9,215 miles) at 12 kts
Armament: three twin 101.6 mm (4-in) DP, one quadruple 2-pdr AA and six twin 20-mm AA guns, and depth charges
Complement: 180

UK

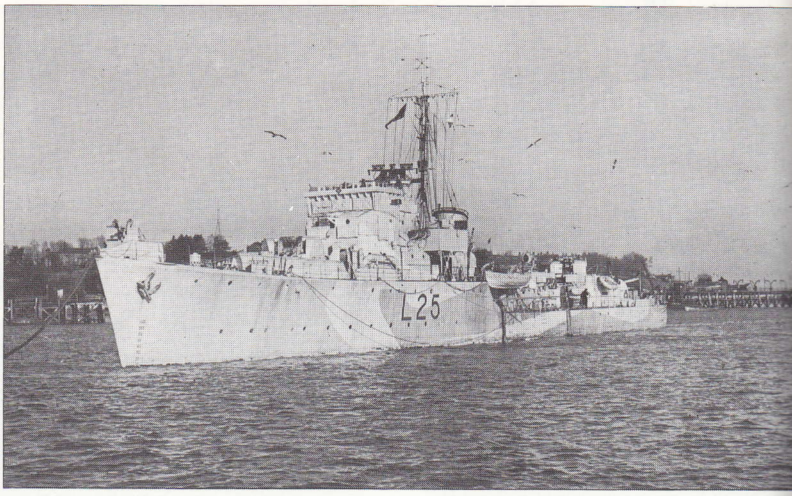
'Hunt' class

Aware of the shortage of escorts even in 1938, the Admiralty designed what was termed a Fast Escort Vessel (FEV) to give convoys both AA and anti-submarine coverage without tying down the precious (and, as it turned out, inadequate) fleet destroyers. Rather shortsightedly, there was perceived the need for speed (in order to prosecute sonar contacts and rejoin smartly) but not endurance. This was seen to be the province of the true escort vessels (which had to refer to the few 'Black Swans' rather than the 'Flowers' or 'Bangors'). To improve them as gun platforms the **'Hunt' class** ships, as they were known, were fitted initially with active stabilizers as standard, but the power demands of these and their poor control systems made them so unpopular that later ships had extra bunker space instead, which considerably improved their very poor endurance.

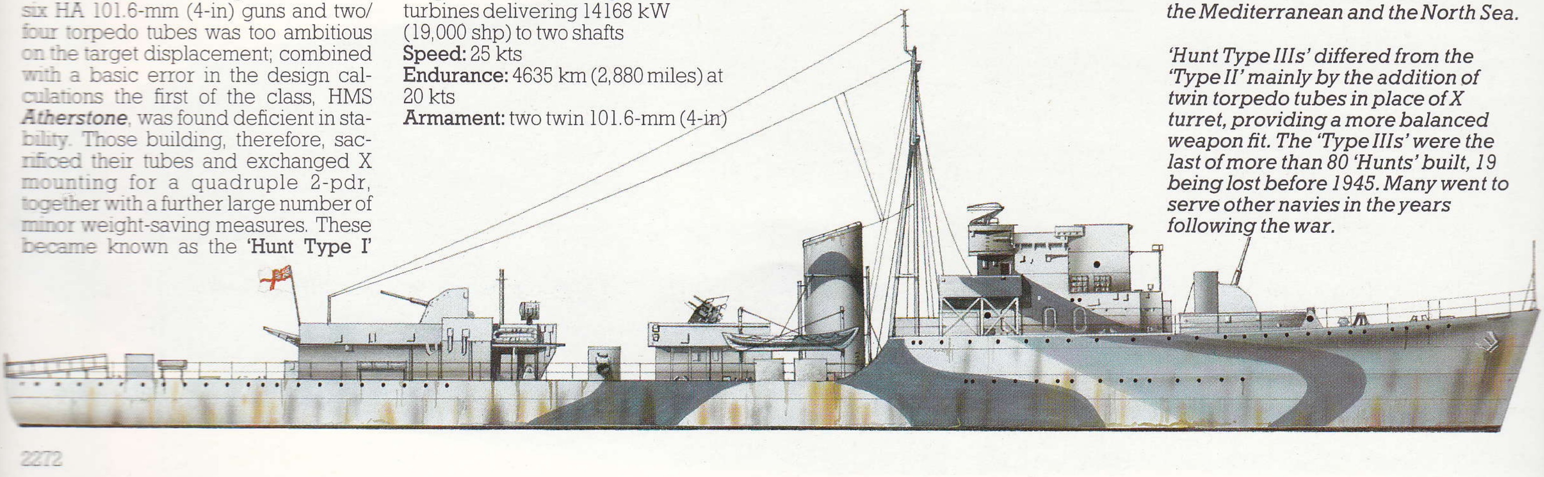
Though their category was simplified to 'destroyer' before they entered service, the 'Hunts' really equated to the 'torpedo boats' of the German and Italian fleets, except that the majority carried no torpedo tubes. This was because the specification for six HA 101.6-mm (4-in) guns and two/four torpedo tubes was too ambitious on the target displacement; combined with a basic error in the design calculations the first of the class, HMS ***Atherstone***, was found deficient in stability. Those building, therefore, sacrificed their tubes and exchanged X mounting for a quadruple 2-pdr, together with a further large number of minor weight-saving measures. These became known as the **'Hunt Type I' class** and were 19 strong. Hulls at an earlier stage of construction were split longitudinally and an extra 0.76 m (2.5 ft) of beam incorporated. These were able to accommodate the specified third 101.6-mm mounting and became the 36 **'Hunt Type II' class** units but, because of their extra fullness, they were rather slower. On the same dimensions a third variant, the 28 **'Hunt Type III' class** units, was produced with only two gun mountings, but with the valuable addition of a twin torpedo tube mounting. War experience showed the guns to be more useful, the Hunts being prominent in the Mediterranean and in the defence of the British east and south coasts. In all, 19 were lost. Significantly only three were to aircraft and of these one was stationary at the time and another was sunk by a glider bomb.

Specification

'Hunt Type III' class
Displacement: 1,015 tons standard and 1,090 tons full load
Dimensions: length 85.7 m (281.25 ft); beam 9.6 m (31.5 ft); draught 2.36 m (7.75 ft)
Propulsion: two sets of geared steam turbines delivering 14168 kW (19,000 shp) to two shafts
Speed: 25 kts
Endurance: 4635 km (2,880 miles) at 20 kts
Armament: two twin 101.6-mm (4-in) DP, one quadruple (and in some vessels one single) 2-pdr AA, and one twin and up to four single 20-mm AA guns, two 533-mm (21-in) torpedo tubes, and depth charges
Complement: 170



The 'Hunt Type I' class destroyer HMS Southdown *lies at her mooring in an east coast port. These small but relatively powerfully armed vessels did not have the range to operate in the Atlantic, but their armament made them more suitable for use in the Mediterranean and the North Sea.*


'Hunt Type IIIs' differed from the 'Type II' mainly by the addition of twin torpedo tubes in place of X turret, providing a more balanced weapon fit. The 'Type IIIs' were the last of more than 80 'Hunts' built, 19 being lost before 1945. Many went to serve other navies in the years following the war.

UK

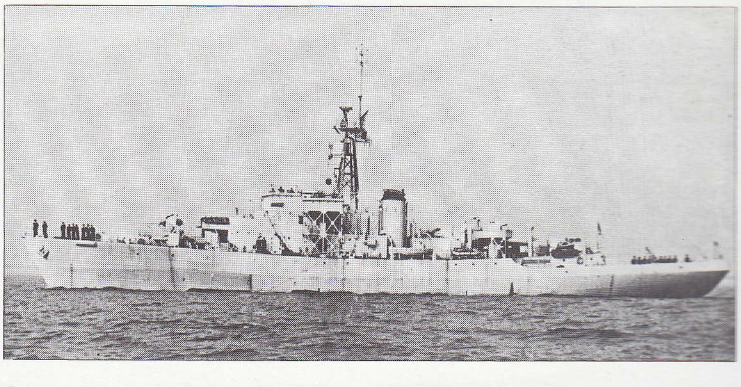
'Castle' class

The last of the 'Flowers' were launched in early 1942 and, considering that their limitations for North Atlantic operations had already begat the true frigate, it may well be assumed that the corvette had reached the end of its development. There were, however, a number of smaller yards engaged in the 'Flower' programme which could not physically cope with the larger frigates. To keep them usefully occupied a large corvette, of length about midway between the 'Flower' and 'River', was designed, again by Smith's Dock, the home of the 'Flowers'. Named after British castles, the new **'Castle' class** ships embodied all the lessons learned with their forebears, while contriving to look remarkably like them. The hull was, again, of sweet line, although designed for series production with a large proportion of welded seams. This showed itself as minor cranks in the sheerstrake, the bow and stern sections being of constant sheer angle rather than the earlier continuous curve. The broad flat transom made for ease of construction and plenty of room aft. Some 44 units were launched in 1943-4, and another 38 were cancelled.

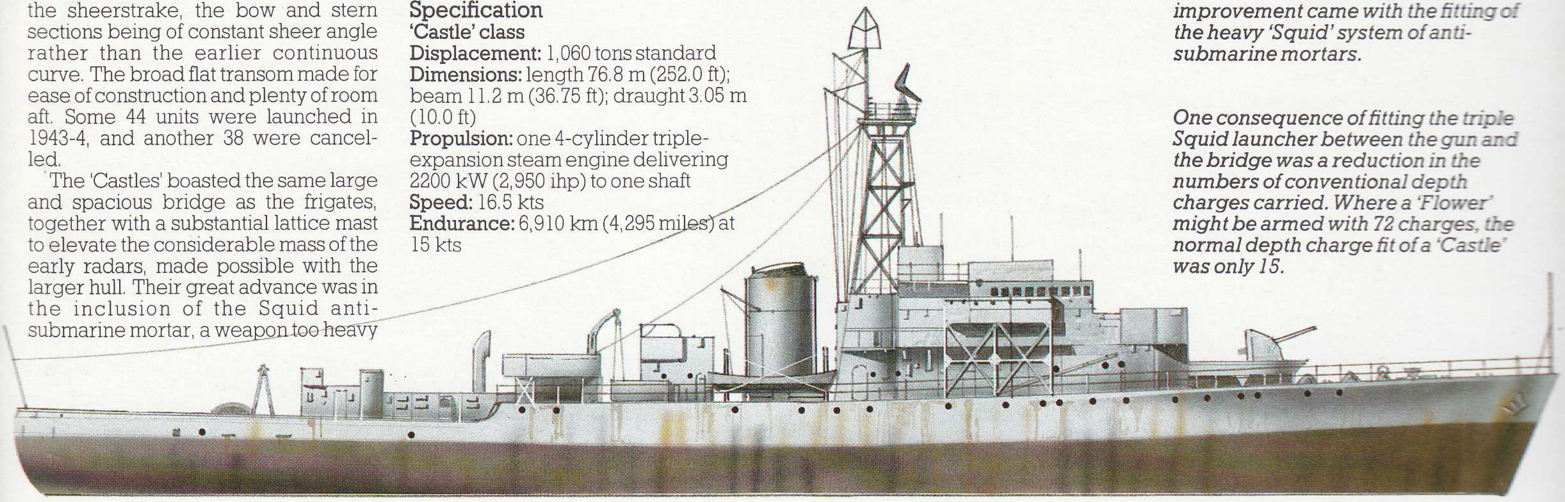
The 'Castles' boasted the same large and spacious bridge as the frigates, together with a substantial lattice mast to elevate the considerable mass of the early radars, made possible with the larger hull. Their great advance was in the inclusion of the Squid anti-submarine mortar, a weapon too heavy for retrofitting into either the 'Flowers' or the 'Rivers'. This was sited at 01 level, forward of the bridge, with a new-pattern 101.6-mm (4-in) gun on a bandstand ahead of it. The squid's advantage was that it could lay a pattern of three heavy bombs around a submerged target up to 500 m (550 yards) ahead while the contact was still in the ship's sonar beam. As the ships retained the single well-tried steam reciprocating engine, the performance of the 'Castle' class did not match that of the frigates and they found their main employment not as close convoy escorts, but in homogeneously-composed escort groups which were being formed in larger numbers toward the end of the war. All were based on the UK with the exception of a dozen transferred to the Royal Canadian Navy and one to the Norwegians.

Specification

'Castle' class
Displacement: 1,060 tons standard
Dimensions: length 76.8 m (252.0 ft); beam 11.2 m (36.75 ft); draught 3.05 m (10.0 ft)
Propulsion: one 4-cylinder triple-expansion steam engine delivering 2200 kW (2,950 ihp) to one shaft
Speed: 16.5 kts
Endurance: 6,910 km (4,295 miles) at 15 kts
Armament: one 101.6-mm (4-in) DP, and two twin and six single 20-mm AA guns, one Squid, and depth charges
Complement: 120



HMS Hedingham Castle *displays her family relationship to the 'Flower' class, but the extra 15 m (50 ft) made a great difference in habitability on the Atlantic run. The major offensive improvement came with the fitting of the heavy 'Squid' system of anti-submarine mortars.*



One consequence of fitting the triple Squid launcher between the gun and the bridge was a reduction in the numbers of conventional depth charges carried. Where a 'Flower' might be armed with 72 charges, the normal depth charge fit of a 'Castle' was only 15.

UK

'Bangor', 'Bathurst' and 'Algerine' classes

'Escort' is an all-embracing word and mention should be made of the contribution of the 'minesweeping sloops' and 'fleet minesweepers', both types of which performed valuable service in either role. Somewhat confusingly, there were still serving 26 coal-burning 'Hunts; of 1917-9 vintage, twin-screw ships with limited sea-keeping ability due to their lack of forecastle. During the 1930s there were built the 'Grimsby' class (with sweep capacity but more truly sloops) and the extensive 'Halcyon' class (ocean minesweepers with a corvette's speed and firepower but viewed as expensive). For series production at the war's outbreak, therefore, the 'Halcyon' was scaled down to produce the **'Bangor' class**. These doughty little 650-ton ships were extremely cramped, their size being governed primarily by the space necessary for the crew. Propulsion was by diesel, steam turbine or steam reciprocating machinery, and 113 ships were built in the UK, Canada, India and even Hong Kong. A further 60 were built in Australia to a modified design known as the **'Bathurst' class**. It will be appreciated that the 'Bangors' were in reality a series of variants.

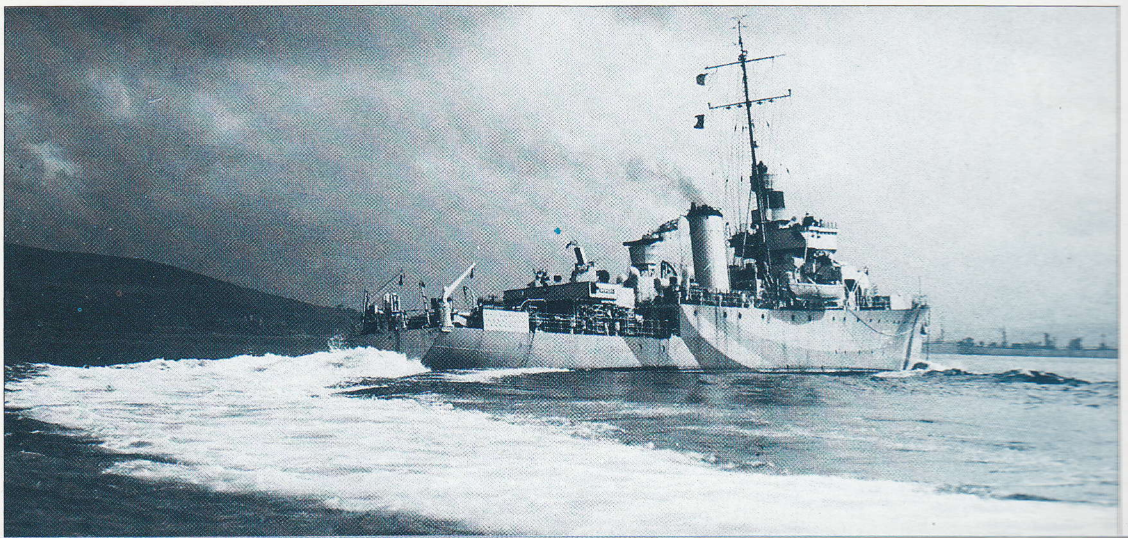
HMIS *Bengal*, an Indian-flag unit of the 'Bathursts', was escorting the Royal Dutch/Shell tanker *Ondina* in the Indian Ocean in November 1942 when attacked by two Japanese surface raiders. The Allied ships had a 12-pdr and a 101.6-mm (4-in) gun between them, yet not only succeeded in fighting off their adversaries with 152.4-mm (6-in) guns but actually sank one of them, the *Hokoku Maru*.

With the need to add the massive generators and electrical sweep gear for magnetic mines to the 'Bangors', already quite cramped with conventional sweeps, an improved 'Halcyon' was produced in the **'Algerine' class**. These smart little ships had adequate space, a good armament and all accommodation thoughtfully sited above the main deck. A total of 101 'Algerines' was built (53 in Canada and 48 in the UK). A dozen were retained by the Royal Canadian Navy with no minesweeping gear but fitted as full anti-submarine escorts, for which they not only shipped a Hedgehog mortar but carried 90 depth charges as well. War losses amounted to seven.

Specification

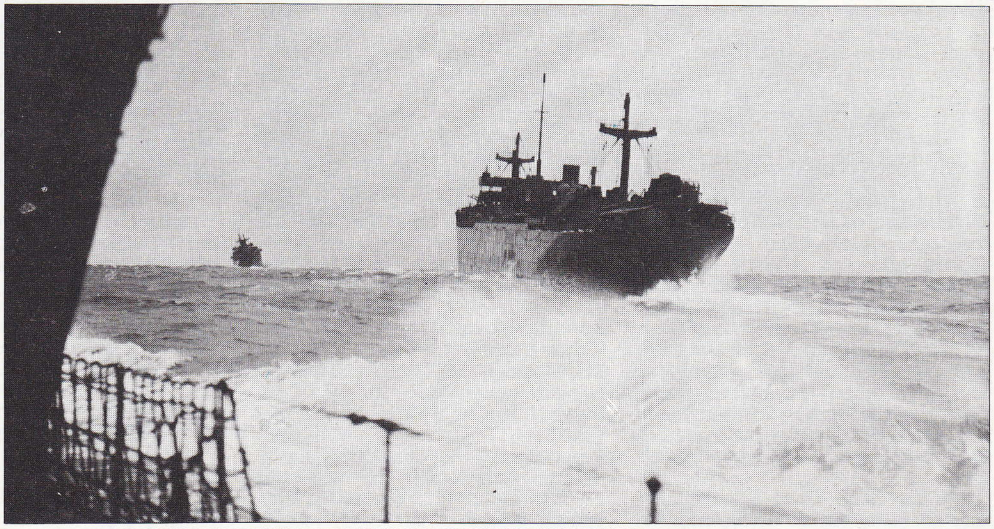
'Algerine' class (as minesweeper)
Displacement: 850 tons standard and 970 tons full load
Dimensions: length 70.1 m (230.0 ft); beam 10.8 m (35.5 ft); draught 2.9 m (9.5 ft)
Propulsion: two sets of geared steam turbines or two sets of triple-expansion steam engines delivering 1491 kW (2,000 hp) to two shafts
Speed: 16.5 kts
Armament: one 101.6-mm (4-in) DP and between four and eight 20-mm AA guns, and more than 90 depth charges
Complement: 105

HMS Rowena *was one of the 'Algerine' class fitted with vertical triple expansion engines, only 29 out of 101 units had the planned turbines. Although used as an escort, the class was really for ocean minesweeping.*



Arctic Convoys

Much of the massive amount of Allied aid sent to the Soviet Union in World War II went via the Cape to the southern USSR. The quickest route was very different: around the enemy-held coast of Norway to the north Russian ports. That perilous passage, and the struggles of the convoys daring to travel it, makes one of the epic tales of the war.



The first stage of the northern convoys featured the familiar hazards of the North Atlantic run, as the convoys made for their assembly points off Iceland. Even in summer the waters of south east Iceland can be unforgiving, and life aboard the merchantmen could be uncomfortable.

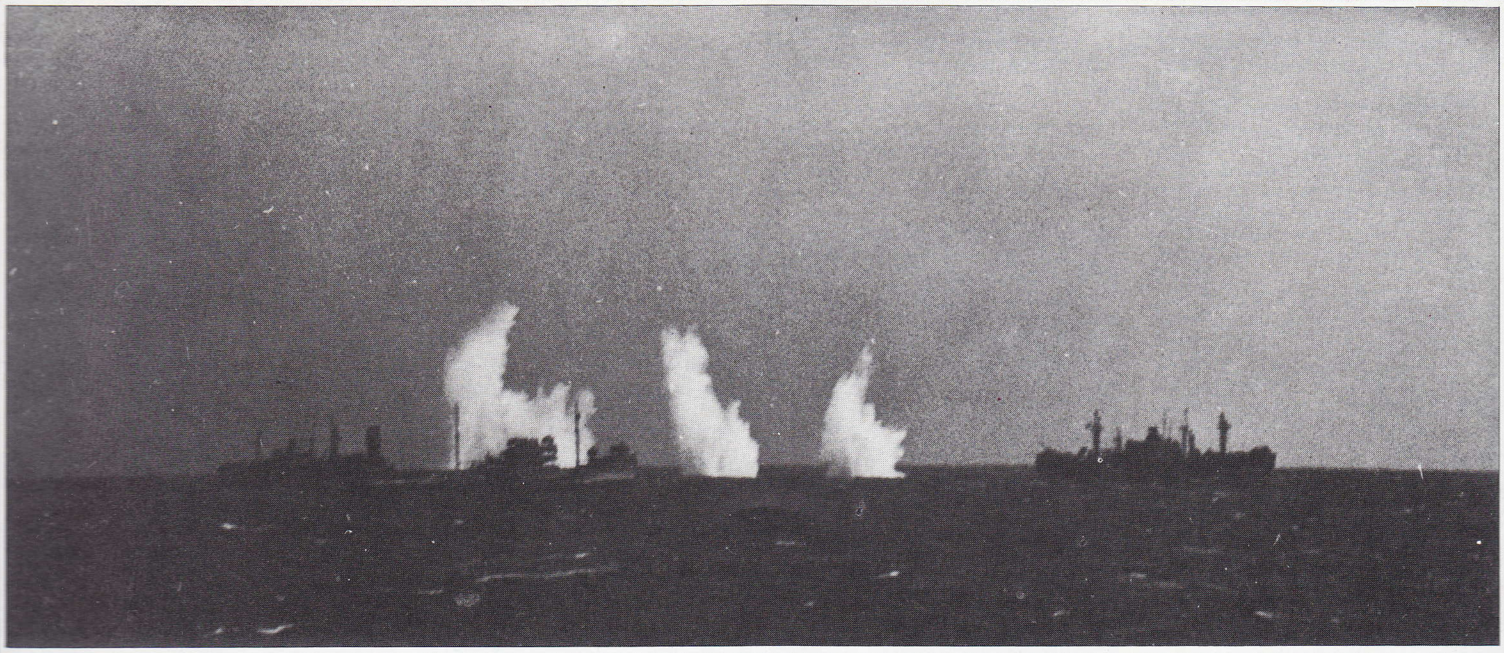
Hitler's ill-advised assault on the USSR in June 1941 gave the beleaguered British an unlikely and problematical ally, rich in human resources and resolve but impoverished in material. Supplies were needed urgently and had to come by sea, adding to the responsibilities of the already sorely-stretched Royal Navy. Because of constraints imposed both by geography and the enemy occupation of the greater part of Europe, only the Soviet Arctic ports could be considered for shipments. Dependent upon the season this would demand a 10- to 15-day passage for convoys, the route flanked to the eastward by a German-occupied Norway. Winter pack ice forced their track closer aboard this hostile coast, with near four months of unbroken darkness and deep gloom affording some cover but at the expense of weather conditions of unrelenting vileness. With the ice sheet retreating in summer, the route could be more distant but was in permanent daylight, and open to virtual round-the-clock attack.

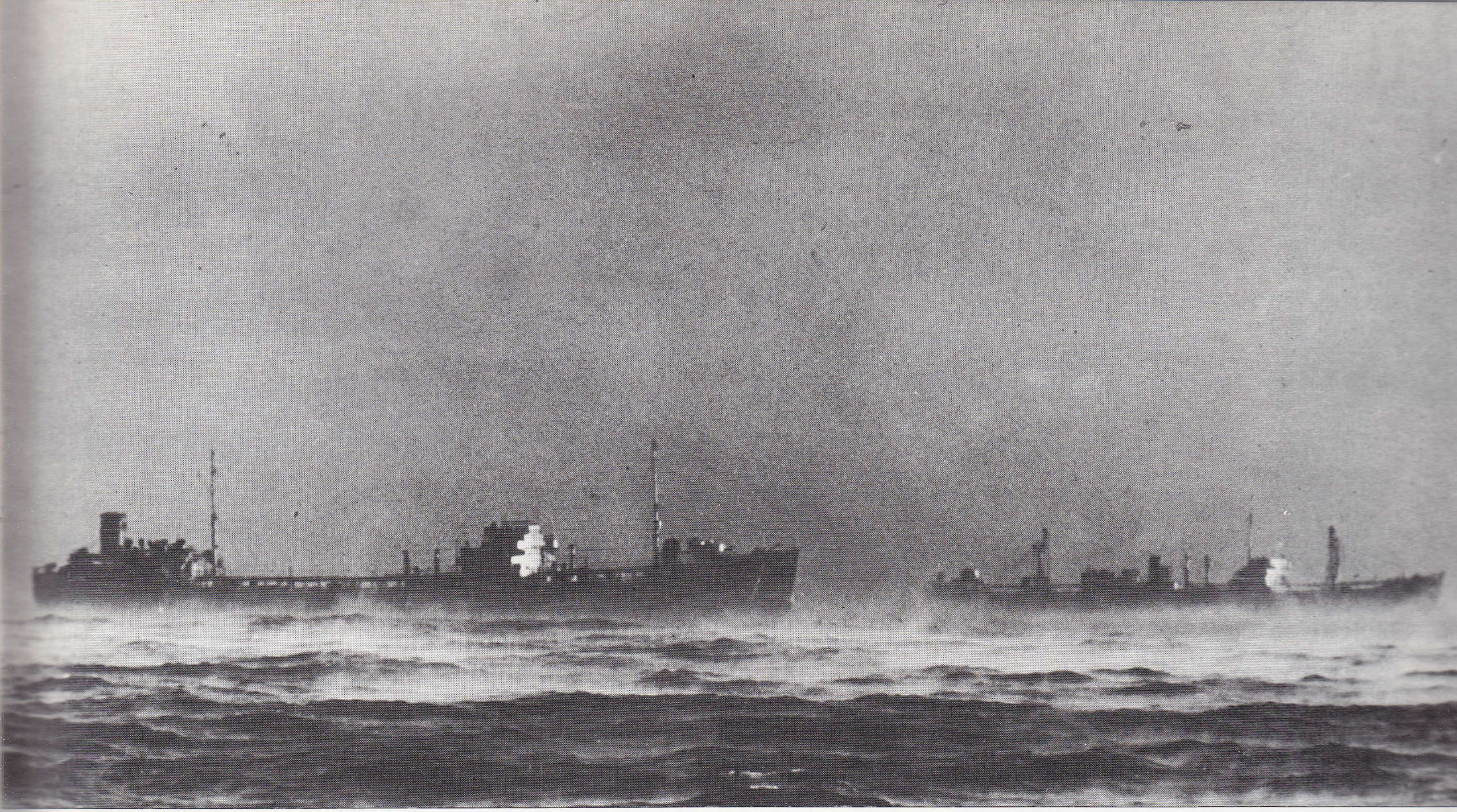
In winter the escort's problems were manifold. Spray coming aboard froze immediately to immobilize weapons and lifesaving gear, and dangerously increase topweight. Convoys were scattered by storms and constantly in need of rounding up. The same warm Gulf Stream water that kept the Soviet Arctic ports icefree also caused frequent fogs on contacting the cold air of the north and, through temperature layering, produced poor Asdic (sonar) conditions. As the route varied from 2250 to 3220 km (1,400 to 2,000 miles) in length, an oiler had usually to accompany the convoy to refuel the escorts.

Where North Atlantic convoys were threatened predominantly by submarines and those in the Mediterranean by surface forces and aircraft, the Arctic run was menaced by all these forms and the escort system organized accordingly. This soon developed the form of an immediate escort, usually of corvettes and anti-submarine trawlers/whalers in the early days; a close cover of free-manoeuvring cruisers with destroyer escort which could rapidly reinforce the convoy on demand; and a distant cover of Home Fleet heavy units to guard against forays by the substantial naval forces built up by the enemy in northern Norway. These Home Fleet units were too valuable to hazard over the complete route and they usually met, and returned with, a southbound convoy in ballast. While this distant cover usually included a carrier in its number, this was too remote to assist the convoy directly, and for long this lack of organic airpower put the convoys at a grave disadvantage as the enemy built up powerful Luftwaffe strength in the north. These units were equipped for effective reconnaissance and strike, with both bomb and torpedo.

On 21 August 1941 the first, unnumbered seven-ship convoy sailed from Iceland for Archangel, arriving without incident 10 days later. This was shortly after the invasion of the USSR and was a political gesture as much as experiment. At this point both the Luftwaffe and U-boat arms were fully committed elsewhere and the escort of a carrier, two cruisers and six destroyers reflected the need to guard primarily against surface attack. The PQ/QP convoy cycle commenced soon after, the inability of the enemy to interfere allowing escort strength to drop to as little as a cruiser and a pair of destroyers.

The northern convoys were threatened from the air, from the sea and from beneath the sea, which meant that escorts had to be ready for anything from flying-boats to the Tirpitz. *This photo, taken from the cruiser HMS* Scylla, *shows a near miss resulting from a Junkers Ju 88 attack.*





The midnight sun illuminates vessels passing through a phenomenon known as 'Arctic mist'. Although seeming to seethe, the sea is in fact very close to freezing, and it is the difference between sea and air temperatures which causes the mist. Anyone in the water at this latitude would die rapidly from exposure.

With the coming of the dark period the cycle was accelerated, so that by early February 1942 12 northbound PQs totalling 93 ships had been passed, with the loss of only one ship to a U-boat. Seven empty QPs had likewise returned without hindrance. With lengthening daylight in March 1942 things livened up with the passing PQ12 and QP8 narrowly avoiding interception by the newly-arrived battleship *Tirpitz* and her destroyers. The foul weather which prevented a sighting also stopped the carrier HMS *Victorious* and three capital ships of the distant cover from making timely contact. As QP8 had only two corvettes and two ocean minesweepers as escort a disaster was only narrowly averted, though it was not appreciated at the time just how nervous the Germans were at the prospect of sustaining losses themselves.

Five ships lost

Only three weeks later the enemy achieved something like co-ordination, and PQ13 lost five ships: two to the very effective Junkers Ju 88 torpedo bomber (whose task was made easier by the weather causing the convoy to lose cohesion), two to U-boats and one to a marauding destroyer force. In tackling the latter, the now-usual close cover was unfortunate to lose the cruiser HMS *Trinidad* to one of her own rogue torpedoes. Two U-boats were sunk, one rammed by one of the ocean minesweepers that gave such yeoman service on the route.

Unpredictable weather reduced to mere chance planned interceptions by both sides. Sixteen of PQ14's 24 ships were obliged to return because of ice conditions but Ju 88s out of Kirkenes sank two of the empty QP10. To combat this increasing aerial menace the best that could be done, in the absence of escort carriers, was to include in the escort a specialist AA ship from PQ15 onwards.

This convoy ran in April 1942 and its distant cover included an American battleship and supporting craft.

As usual, however, the threat to the convoys was more immediate and again the navy took the brunt of the attack, losing the cruiser HMS *Edinburgh* to destroyers. Even though this was effectively the enemy destroyers' final throw, over 260 Luftwaffe aircraft and over 30 U-boats were by now available, and both remaining 'pocket battleships' had been moved north. Despite the daylight lengthening ominously, politics demanded the running of PQ16 in May. It suffered seven losses, six of them to aircraft, and the CAM ship that was all that could be spared by way of extra protection was, itself, sunk.

By the end of June, when PQ17 sailed, German surface forces in the north had been reinforced by the battleship *Tirpitz*, a heavy cruiser and all remaining serviceable destroyers. The convoy was well covered by an apprehensive Admiralty, which was all too aware that the initiative lay totally with the enemy. By 1 July eight U-boats were concentrating on the convoy, which was also under continuous aerial surveillance. Only on 4 July, however, did the attack develop and, though this was by torpedo aircraft, the Admiralty ordered the convoy to scatter, firmly believing that the *Tirpitz* was out. As it happened she did not sail until the next day and then, hedged with restrictive operational instructions, returned almost immediately. This, however, did not help the convoy which lost 23 out of its 34 ships to aircraft and submarine as, singly or in small groups, they struggled the last 1285 km (800 miles) virtually unescorted.

Not until September 1942 did the next convoy run, PQ18. Its 40 ships enjoyed a formidable escort that, at last, included an escort carrier. The enemy mounted a major effort but, though mass air attack sank 10 ships and U-boats a further three, the price was the loss of three U-boats and 27 aircraft.

Subsequent northbound convoys were recoded JW, starting at JW51. This much-delayed operation ran in two parts. Neither suffered loss but the cruiser and destroyer close cover of JW51B fought a spirited defensive action against superior enemy surface forces on the last day of 1942. The latter's lacklustre performance provoked a high level row between Hitler and Admiral Erich Raeder, the latter resigning in protest.

Between February and November 1943 no convoys ran as all escorts were diverted to the Atlantic route, where the U-boat offensive had reached its peak. Then, within the space of nine weeks, a total of 106 ships passed north in six operations for the loss of only three ships. Of these movements the fifth (JW55B) was significant as the lure that attracted the battlecruiser *Scharnhorst*. At last the trap sprang, with the *Scharnhorst* being intercepted on Boxing Day 1943 and occupied by the cruisers of the close cover until the battleship HMS *Duke of York* could get on the scene. The latter ship, with her destroyers, decisively terminated the enemy's long career.

From spring 1944 the convoys doubled in size and were accompanied by one, or even two, escort carriers. The aircraft from these made short work of shadowers while ever less-experienced U-boat commanders found themselves pitted up against 20 destroyers and a battle-hardened support group before being able to penetrate as far as the corvettes of the close escort itself. Not surprisingly, the convoys ran to the close of hostilities with small inconvenience other than from the eternal, remorseless weather.

In all, 1,526 ship movements were involved in 77 convoys to and from North Russia, 98 ships being lost. Overall success was due to the dedication and perseverence of both merchantmen and escorts alike.

UK

'River' class

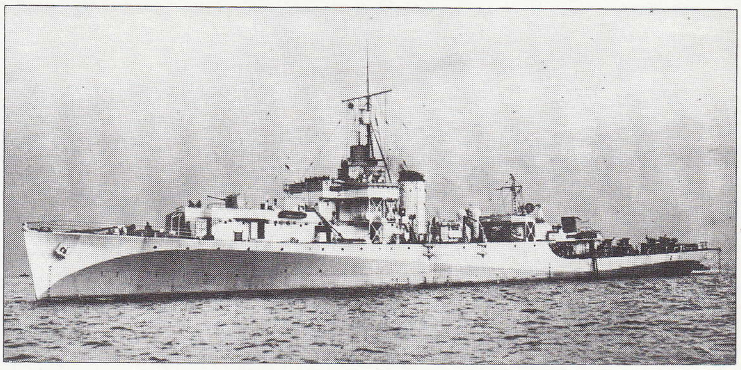
With the limitations of the 'Flowers' readily apparent, the Admiralty rapidly produced a design for a larger 'twin-screw corvette' which became known as the **'River' class**. (The term 'frigate' was not officially reintroduced until 1942). Overall they were about 28.30 m (93 ft) longer than the later 'Flowers' and this made a very great difference in seakeeping, bunker capacity, installed power and armament. Between 1942 and 1944 some 57 were launched in the UK, 70 in Canada and 11 in Australia.

The hull had the raised forecastle extended well aft, with a low quarter-deck for the depth-charge gear and the minesweeping equipment with which too many useful escorts were cluttered at that time. They were the first ships to be fitted as standard with the Hedgehog anti-submarine spigot mortar which, with new sonar gear, made for a more rapid and accurate attack. The Hedgehog was originally sited well forward and was thus extremely exposed, but later units had the weapon split into two 12-bomb throwers which were sited one deck higher, winged out abaft the forward 101.6-mm (4-in) gun. Longer endurance demanded a larger depth-charge capacity, and up to 200 could be carried, compared with a maximum of 70 on the 'Flowers'.

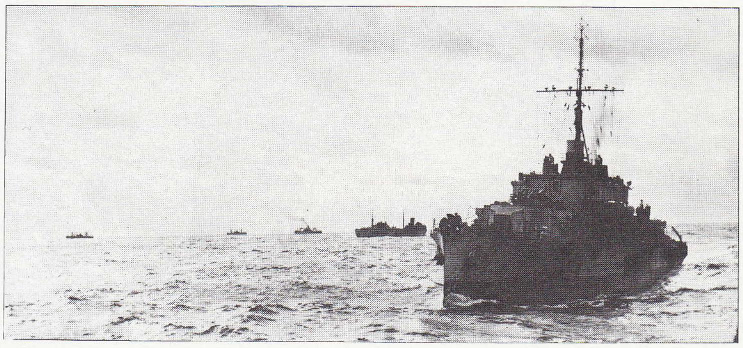
Though not developed from a mercantile hull form the 'Rivers' were built to mercantile standards, which speeded construction. They featured a flat transom, which not only obviated much of the complex curvature of traditionally-shaped sterns but also actually improved the hull hydrodynamics. It is noteworthy that over half the 'Rivers' were Canadian-built (with more ships coming from Australia) and it is probably all too easily overlooked how magnificent a contribution the Canadian yards and the Royal Canadian Navy made to victory in the Atlantic. Most Canadian-built units had a twin 101.6-mm mounting forward and a single 12-pdr aft. They also had their full outfit of 14 20-mm weapons, which British-built ships rarely achieved. The machinery was simply that of the 'Flowers' doubled, though drawing steam from more efficient water-tube boilers. Four ships only were built with steam turbines, which were not generally adopted as a result of shortages of components. The 'Rivers' were highly successful, but most of the survivors (seven were sunk in the war) had been scrapped by the mid-1950s. Further 'Rivers', to a slightly modified design, were built by the Americans as the **'PF' type**; of these 21 served in the Royal Navy as the **'Colony' class**.

Specification

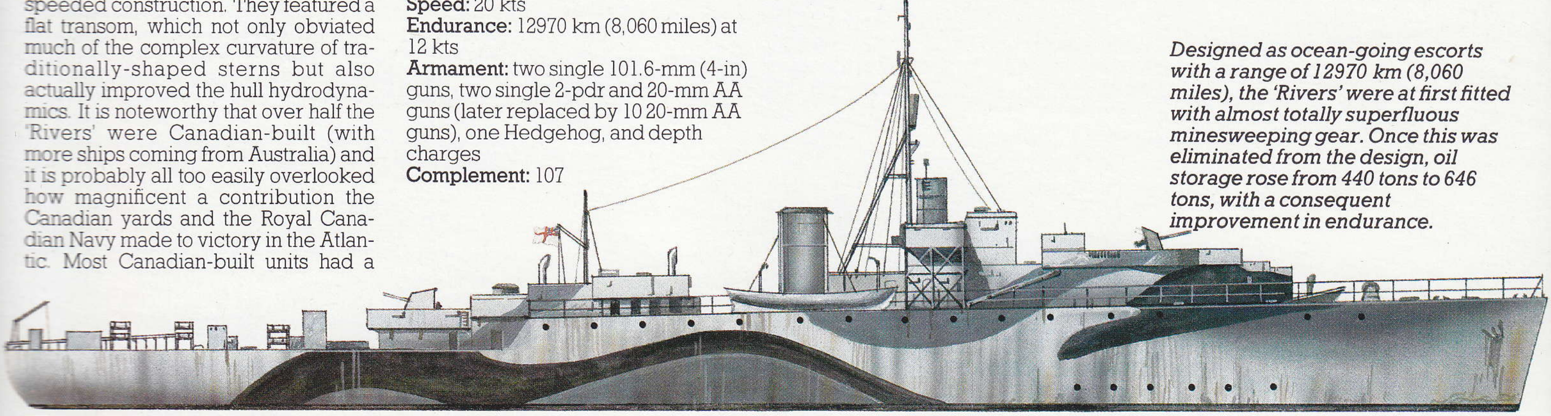
'River' class (original specification)
Displacement: 1,370 tons standard
Dimensions: length 91.9 m (301.5 ft); beam 11.12 m (36.5 ft); draught 3.91 m (12.83 ft)
Propulsion: two sets of 4-cylinder triple-expansion steam engines delivering 4101 kW (5,500 ihp) to two shafts
Speed: 20 kts
Endurance: 12970 km (8,060 miles) at 12 kts
Armament: two single 101.6-mm (4-in) guns, two single 2-pdr and 20-mm AA guns (later replaced by 10 20-mm AA guns), one Hedgehog, and depth charges
Complement: 107



HMS Helmsdale *was a 'River' class frigate, and as such was a great improvement on previous escort designs. Unlike most 'Rivers', she had her prominent Hedgehog ASW mortar system replaced by the much heavier and effective Squid triple barrelled ASW charge launcher.*



A typically battered Atlantic escort, HMS Spey *steams up the line of a convoy during February 1944, when this particular 'River' class frigate sank the Type VIIC U-boats* U-406 *(on 18 February) and* U-386 *(on 19 February).*



Designed as ocean-going escorts with a range of 12970 km (8,060 miles), the 'Rivers' were at first fitted with almost totally superfluous minesweeping gear. Once this was eliminated from the design, oil storage rose from 440 tons to 646 tons, with a consequent improvement in endurance.

UK

'Loch' and 'Bay' classes

The **'Bay' class** began to appear late in 1944 as a direct consequence of the course of the war, and in 1945 the last of 19 was launched. In the Atlantic the dour struggle against the U-boat had been successful (though was not yet done) and planning began to be directed more at building up the British Pacific Fleet in order to make a real contribution in the defeat of Japan, before reclaiming the UK's lost imperial possessions in the East.

In the Atlantic war the Canadian yards had been concentrating on production of 'Modified Rivers', to which they were most suited, while in the UK production since the commencement of 1944 had been of the **'Loch' class**, of which 31 were completed as escorts. This bore all the marks of its 'River' class ancestry in appearance and machinery, but had important differences. For the first time all corners had been cut to allow the introduction of modular construction, the shipbuilder assembling hull components from a variety of sources. The structure had been greatly strengthened to allow the installation of a pair of triple-barrelled Squid anti-submarine mortars forward of the bridge. The spacious quarter-deck was now devoted not so much to depth charges and their caparison (whose functions the Squid had largely superseded) but to the trappings of a more scientific war, largely the towed Foxer gear, for defeating the menace of the acoustic torpedo with its affinity for frigate propellers. A major difference from the recognition point of view was the substantial lattice mast for the all-important radars. The 'Lochs' proved deadly against the U-boat but,

HMS Loch Tarbert *comes alongside after a voyage with a fo'c'sle party ready to pass a line ashore. Improved versions of the 'River' designs, the 'Loch' class had a pair of triple-barrelled Squid ASW mortars as main anti-submarine weaponry.*

'Loch' and 'Bay' classes (continued)

though they soldiered on after the war until the 1960s, their speed would have been totally inadequate to meet the threat of such as the 'Type XXI' U-boats. These fortunately arrived too late, but during the early 1950s stimulated the prototype fast frigate in the 'Type 15' destroyer conversions.

In contrast, the Pacific war was predominantly AA in nature, and the 19 units of the **'Bay' class** completed in 1944-5 were no more than 'Lochs' with their forward 101.6-mm (4-in) and after quadruple 2-pdr guns replaced by two twin HA 101.6-mm mountings, with a proper director atop the bridge. The heavy Squids, now non-essential, were replaced by the less effective Hedgehog, allowing also the substitution of two twin 40-mm mountings for some of the original 20-mm weapons.

Specification

'Bay' class

Displacement: 1,580 tons standard

Dimensions: length 93.6 m (307.25 ft); beam 11.73 m (38.5 ft); draught 2.9 m (9.5 ft)

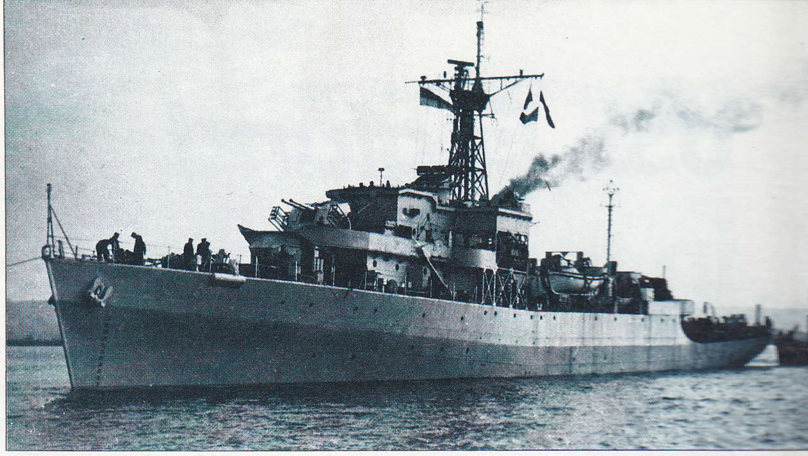
Propulsion: two sets of 4-cylinder triple expansion steam engines delivering 4101 kW (5,500 ihp) to two shafts

Speed: 19.5 kts

Endurance: 17605 km (10,940 miles)

Armament: two twin 101.6-mm (4-in) DP, two twin 40-mm AA and two twin 20-mm AA guns, one Hedgehog, and depth charges

Complement: 157



The 'Bay' class frigates were versions of the 'Loch' class optimized for Pacific operations, where escorts were more likely to be attacked from the air. The heavy Squid system was landed in favour of the lighter but less effective Hedgehog, and AA armament was improved.

USA

DE type

The Americans, like the Japanese, had seen little need of defensive ships such as escorts before the war and, in its early days had little beyond their totally unsuitable and veteran flush-deckers. It was the Royal Navy, desperately seeking to meet the submarine threat, that produced a specification for an Atlantic escort, followed by orders for no less than 300 being placed in the USA between November 1941 and January 1942. Termed by the Americans destroyer escorts (**DE type**, a new category), they also met the sudden need at home, and the organization was put in hand to build over 1,000 of them, though the earliest still arrived too late to prevent the backyard holocaust known to the U-boat men as the 'Happy Time'.

The DEs were built after the fashion of American fleet destroyers, having a long flush deck with a prominent sheer line in place of the more commodious long forecastle decks preferred by the British. Far more emphasis was placed on gun armament, with superimposed 76.2-mm (3-in) guns forward, a single aft and numerous guntubs with a mixture of close-range weaponry, mostly single 20-mm guns. Hedgehog was sited forward and, by RN standards, the after deck was cramped, though by the use of double-depth, sided stowage racks the British units (78 **'Captain' class**) managed to stow upwards of 200 depth charges.

Although 'only' 565 DEs were eventually completed, their construction rate was phenomenal, no less than 425 being commissioned in the 12 months between April 1943 and April 1944 alone. Bethlehem actually completed the USS ***Underhill*** (DE 682) in under two months! The US Navy was very much a 'steam-turbine' navy, but production on this scale was impossible so the ships fell into several classes, depending on whether they were diesel (85 **'Edsall' class** units) diesel-electric (97 **'Evarts'** and 76 **'Bostwick' class** units) or turbo-electrically (152 **'Buckley'**, 74 **'John C. Butler'** and 81 **'Rudderow' class** units) driven. Most of those incorporating diesels were low powered as the bulk of existing diesel output was at that time earmarked for landing craft. As anti-submarine ships the DEs were very effective, while many went on after the war to be converted into fast transports (APD) or radar-pickets (DER).

Specification

'Buckley' class

Displacement: 1,400 tons standard and 1,720 tons full load

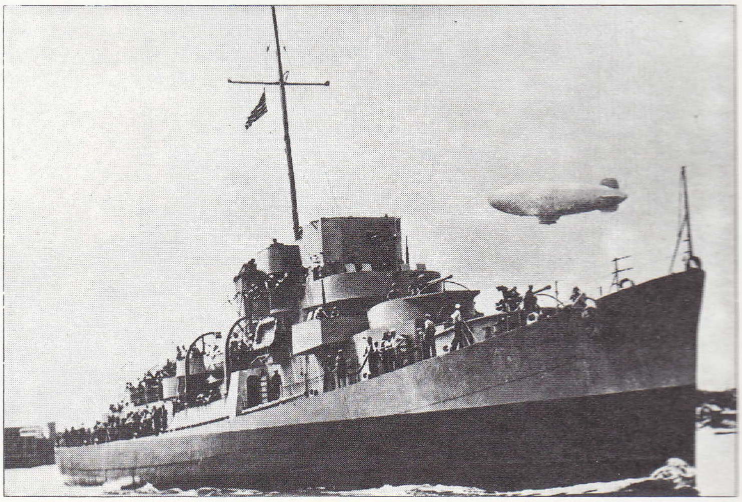
Dimensions: length 93.27 m (306.0 ft); beam 11.27 m (37.0 ft); draught 2.89 m (9.5 ft)

Propulsion: two sets of geared steam turbines and two propulsion motors delivering 8948 kW (12,000 shp) to two shafts

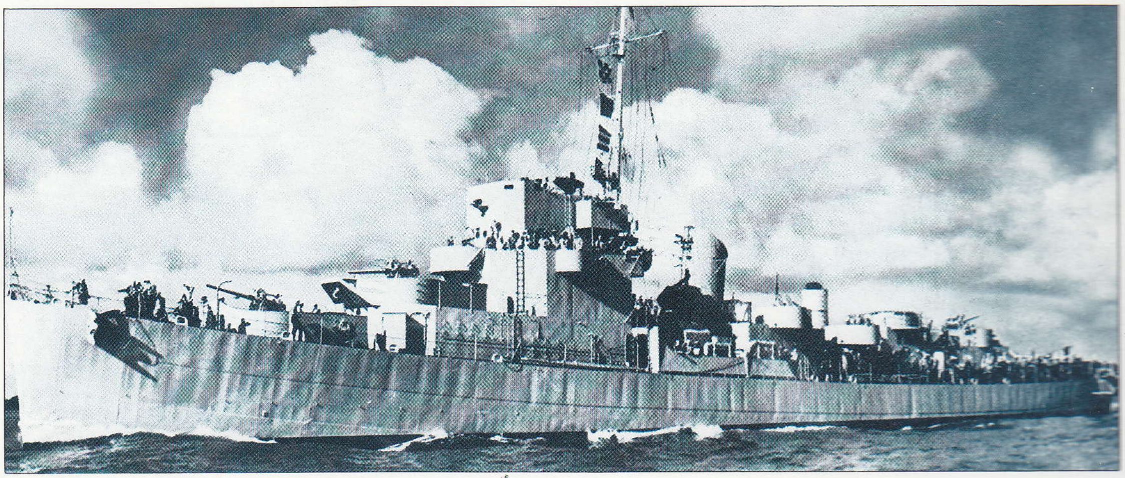
Speed: 24 kts

Armament: three single 76.2-mm (3-in) DP, six single 40-mm AA, and two twin and four single 20-mm AA guns, three 533-mm (21-in) torpedo tubes, one Hedgehog, and depth charges

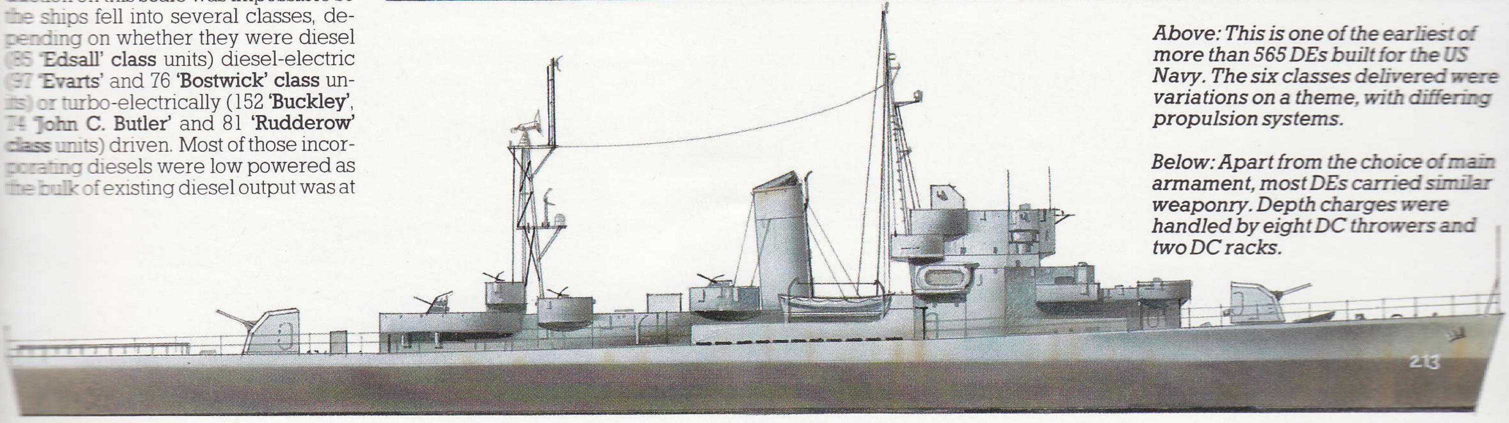
Complement: 220



USS Harmon, *a turbine-powered destroyer escort launched in July 1943, was named after a Navy Cross winner killed in the sea battle off Guadalcanal. The* Harmon *established a record, being delivered to the navy only 92 days after the keel was laid. Later vessels were built in even shorter times.*



Above: This is one of the earliest of more than 565 DEs built for the US Navy. The six classes delivered were variations on a theme, with differing propulsion systems.



Below: Apart from the choice of main armament, most DEs carried similar weaponry. Depth charges were handled by eight DC throwers and two DC racks.

USS *England* in the Philippine Sea

The Pacific war was the war of the carrier and the destroyer, of the night torpedo attack and the air battle over hundreds of miles of ocean. It was not a war noted for its cat-and-mouse battles between escort and submarine, yet it was on the fringes of one of those titanic carrier battles that USS* England *produced one of the most astonishing performances of the war.

As with all large scale Japanese operations, that known as 'A-Go', which resulted in the Battle of the Philippine Sea in June 1944, was meticulously planned. It was hoped to lure substantial US naval forces into waters north of the Admiralties, across a well-prepared submarine trap. Japanese tactical doctrine saw the primary roles of the submarine as a scout attacking warships, and 25 were deployed for the purpose, many in the waters mentioned and over a month beforehand.

In mid-May the three 'Buckley' class DEs USS *England*, *George* and *Raby* were on a mission to harass the enemy supply line to Bougainville when, in the early afternoon of 19 May, the first-named gained sonar contact on a submerged submarine. Only a few of the Pacific escorts were armed with Hedgehog; the recently commissioned *England* was, and attacked without hesitation. The second salvo produced the sound of two direct hits but, lacking immediate evidence of a 'kill', she followed up with three more salvoes, the last of which produced three small explosions, followed by a massive detonation which lifted the after end of the ship bodily in the water. It marked the end of the *I-16*, a submarine larger than the DE.

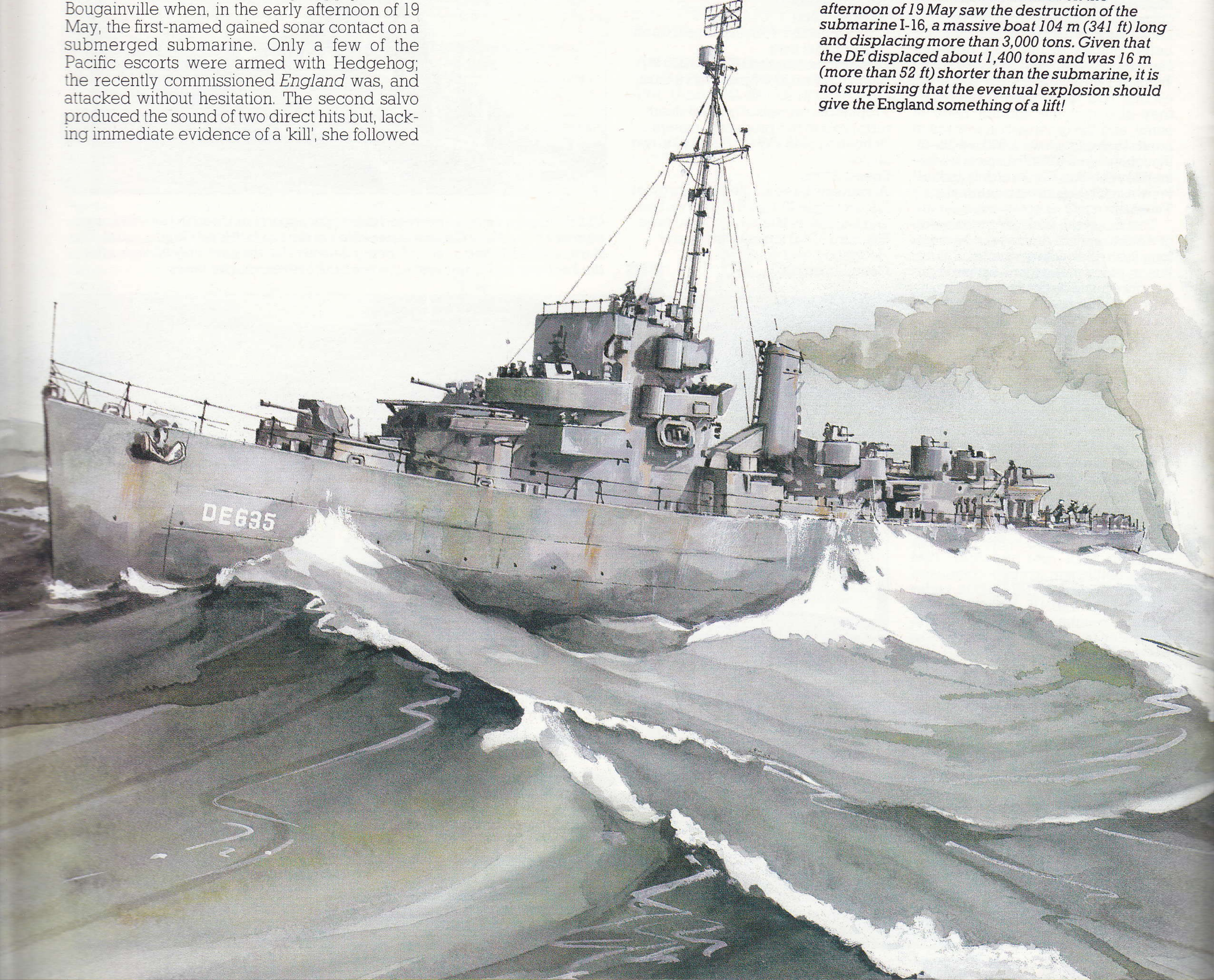
The little group was proceeding north westward outside the Bismarcks when, at 03.50 on 22 May, it caught the *RO-106* charging batteries on the surface. The *George* caught her in her searchlight as she dived, and offloaded a pattern of depth charges over the spot. Again there was no instant result and the *England* waded in with a Hedgehog salvo. A first-time bulls-eye left only oil and wreckage rising to mark the spot.

This submarine had been the northernmost of a line and her neighbour, the *RO-104*, was detected before breakfast on the next morning. Both the *George*, the senior ship, and *Raby* attacked without success. It remained again for the *England* to zero in. Again there was ample evidence for a claim.

Salvo fired

As there was now adequate evidence of a submarine line the group moved further south westward and, sure enough, the *George* secured a radar contact on a rapidly submerging target in the early hours of 24 May. Sonar conditions were good, so the *England* carefully gauged bearing and depth before firing a deliberate salvo of her few remaining bombs. Though the target was running deep there

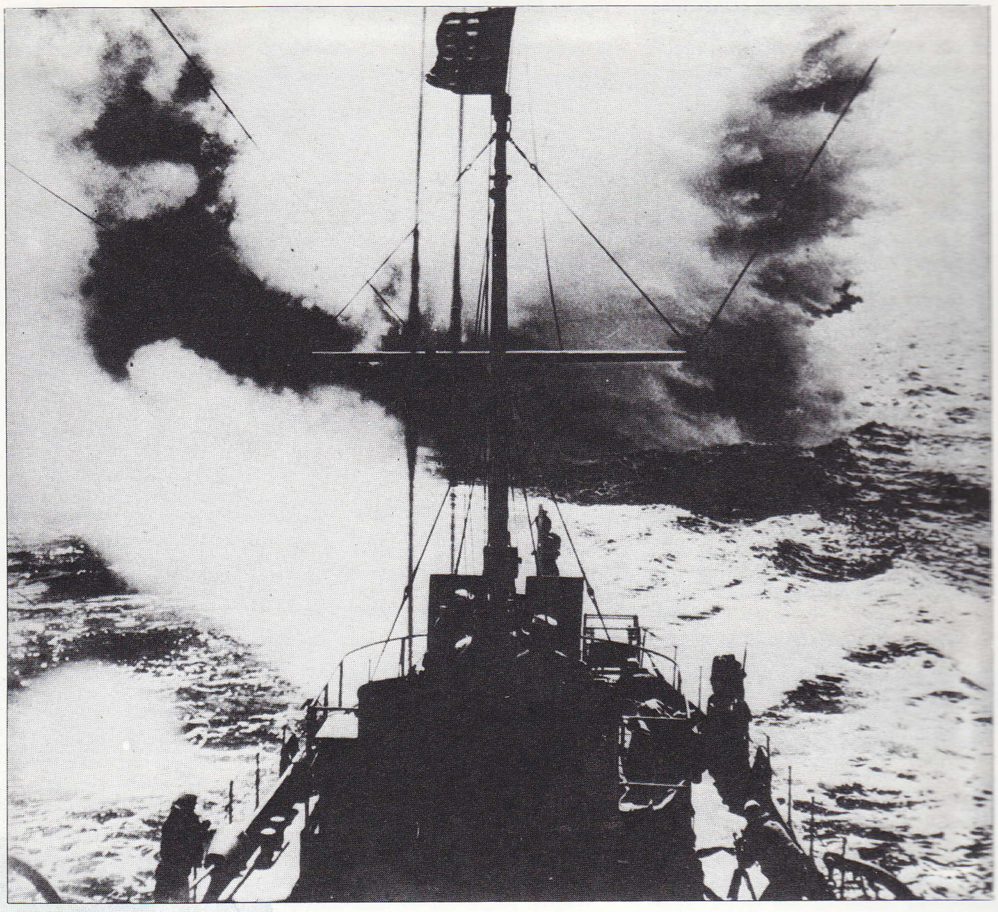
The most interesting of USS England*'s kills may well have been her first. The attack on the afternoon of 19 May saw the destruction of the submarine* I-16*, a massive boat 104 m (341 ft) long and displacing more than 3,000 tons. Given that the DE displaced about 1,400 tons and was 16 m (more than 52 ft) shorter than the submarine, it is not surprising that the eventual explosion should give the* England *something of a lift!*



came a muffled explosion. This fourth victim was the *RO-116*.

Returning to Manus on 26 May to refuel and rearm, the group found yet another submarine. A sonar contact was gained by the *Raby*, lost, regained by the *England* and presented with the usual precision Hedgehog pattern. Again a hole-in-one, it disintegrated the *RO-108* in a series of rumbling explosions clearly audible from the surface.

Rapidly topped up, the ships immediately sailed again to join an ASW group based on a CVE. One of the latter's destroyers flushed a submarine but could not leave to attack it. The DEs stayed in contact all night and, after a series of unsuccessful attacks by the other ships, the *England* was finally allowed a go. The almost inevitable result was the *RO-105* sunk with a single salvo at 07.35 on 31 May. The *England* had set a record which still stands: six enemy submarines sunk in 12 days. Of the 25 Japanese submarines deployed, 17 were sunk. Their tactics were poor, they were badly placed, they achieved nothing and they were wasted.



Right: The colossal detonation of a depth-charge pattern throws a column of water higher than the mast of the destroyer escort. US shipyards churned out over 500 of these vessels, 80 per cent of which were completed between April 1943 and April 1944 – a production rate that spelt doom for Axis submarines.

The performance of USS England *in the Philippine Sea was almost unbelievable. While there was undoubtedly an element of luck (as there is in all great victories) in the sinking of six submarines in 12 days, good teamwork, keeness and the rapid advance of anti-submarine technology all played their part.*

USA

PC and PCE types

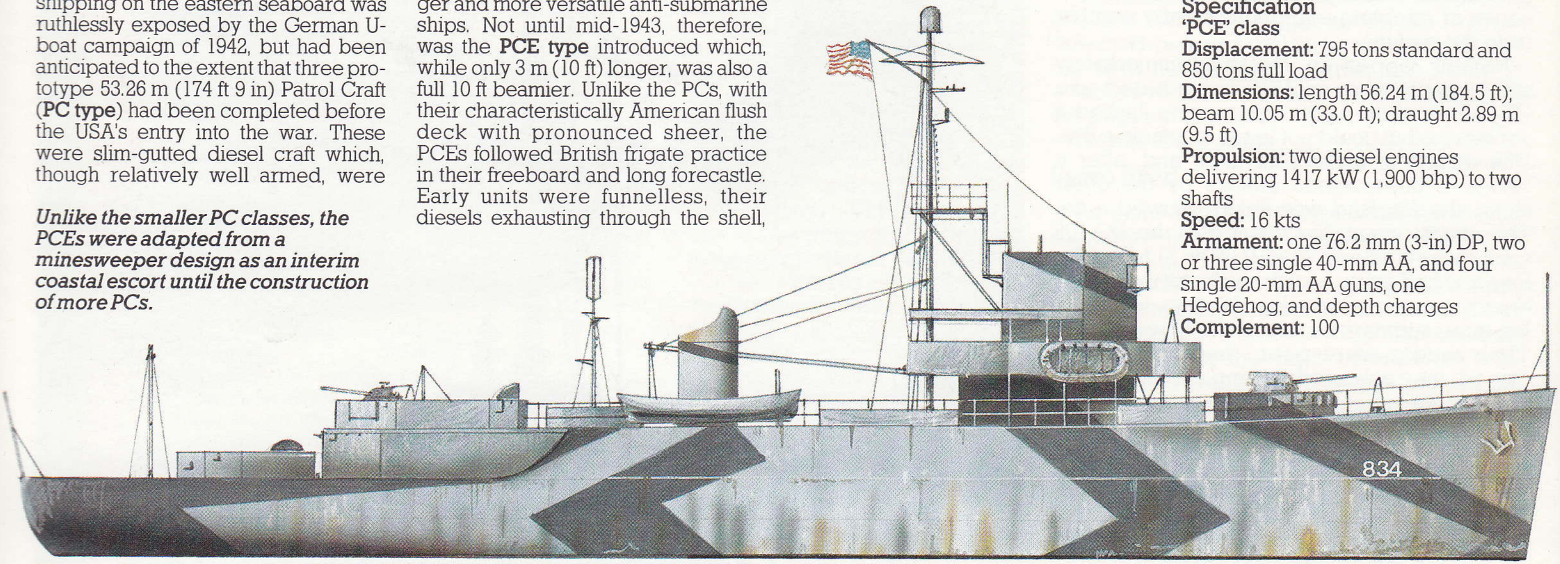
Given the immense length of the Atlantic and Pacific coasts together with further major transCarribbean routes, particularly to the Venezuelan oil terminals and the Panama Canal, the US Navy had a major problem in protecting its coastal traffic, the pattern and volume of which was very different to that of the UK. The vulnerability of the shipping on the eastern seaboard was ruthlessly exposed by the German U-boat campaign of 1942, but had been anticipated to the extent that three prototype 53.26 m (174 ft 9 in) Patrol Craft (**PC type**) had been completed before the USA's entry into the war. These were slim-gutted diesel craft which, though relatively well armed, were restricted by their size to inshore work. Needing to expand the escort fleet rapidly and with the PC design to hand, it is understandable that a massive construction programme was rapidly instituted. In fact, over 350 of these craft were built using resources that, in retrospect, would better have been diverted to the production of larger and more versatile anti-submarine ships. Not until mid-1943, therefore, was the **PCE type** introduced which, while only 3 m (10 ft) longer, was also a full 10 ft beamier. Unlike the PCs, with their characteristically American flush deck with pronounced sheer, the PCEs followed British frigate practice in their freeboard and long forecastle. Early units were funnelless, their diesels exhausting through the shell, but later examples had a thin stovepipe and the last a diminutive stack with a curved cap. Construction amounted to 78 units.

Their armament was better than that of many British frigates, a 76.2-mm (3-in) gun and a full Hedgehog forward, two/three single 40-mm and up to five 20-mm AA guns, with depth charges aft. Fifteen crossed the Atlantic for service with the Royal Navy. Known as the **'Kil' class** they served primarily off Gibraltar and Sierra Leone. One, HMS ***Kilmarnock***, participated in the only U-boat sinking credited to the class, that of the *U-731* off Tangier in May 1944.

Specification

'PCE' class
Displacement: 795 tons standard and 850 tons full load
Dimensions: length 56.24 m (184.5 ft); beam 10.05 m (33.0 ft); draught 2.89 m (9.5 ft)
Propulsion: two diesel engines delivering 1417 kW (1,900 bhp) to two shafts
Speed: 16 kts
Armament: one 76.2 mm (3-in) DP, two or three single 40-mm AA, and four single 20-mm AA guns, one Hedgehog, and depth charges
Complement: 100

Unlike the smaller PC classes, the PCEs were adapted from a minesweeper design as an interim coastal escort until the construction of more PCs.



FRANCE

'Elan' class

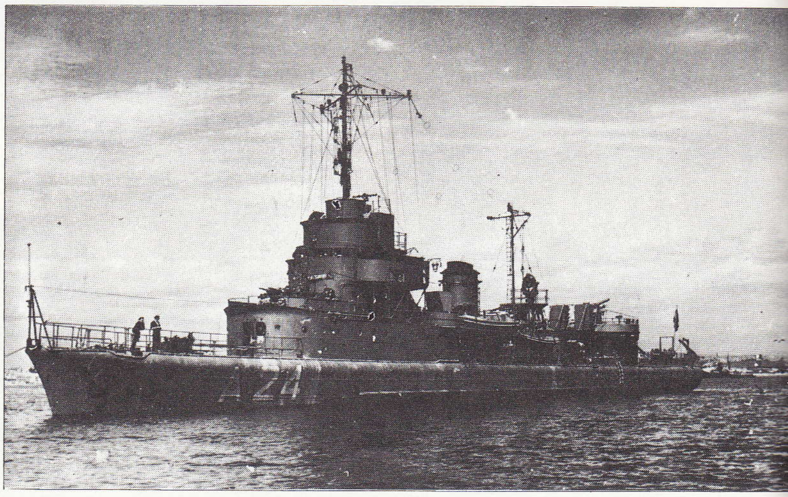
At the outbreak of war the French fleet was poorly served for escorts in the accepted sense of the word, those available being designed primarily for colonial service. For effective anti-submarine work during the war, therefore, the Free French navy relied on frigates, corvettes and DEs transferred from the Royal Navy or the US Navy.

The 13-strong **'Elan' class** had been completed in 1939-40 as corvette-type vessels with minesweeping capability. Their 78 by 8.48 m (255.9 by 27.8 ft) hull dimensions, compared with the 62.50 by 10.10 m (205 by 33.1 ft) of the British-built 'Flowers' that served under the same flag, characterize the greatly different approach, with strong emphasis on speed. Despite their fine lines, however, their low-power twin-shaft diesel machinery could drive them at only 20 kts, but their excellent official endurance figures emphasize the economy of diesel propulsion. The first group was decidedly odd in appearance, with a distinctively low foredeck. What was in the designer's mind is hard to say but acute wetness must well have been anticipated as the bridge was perched atop a solid house. No armament was mounted forward and the impact of green seas on the front of the house can only be imagined. An interesting detail was the rounded sheerstrake, extending the length of the hull, possibly better to accommodate the anticipated stresses generated in the hull when labouring in heavy seas. Two 100-mm (3.94-in) guns could be carried though only one was usually fitted, on the after house.

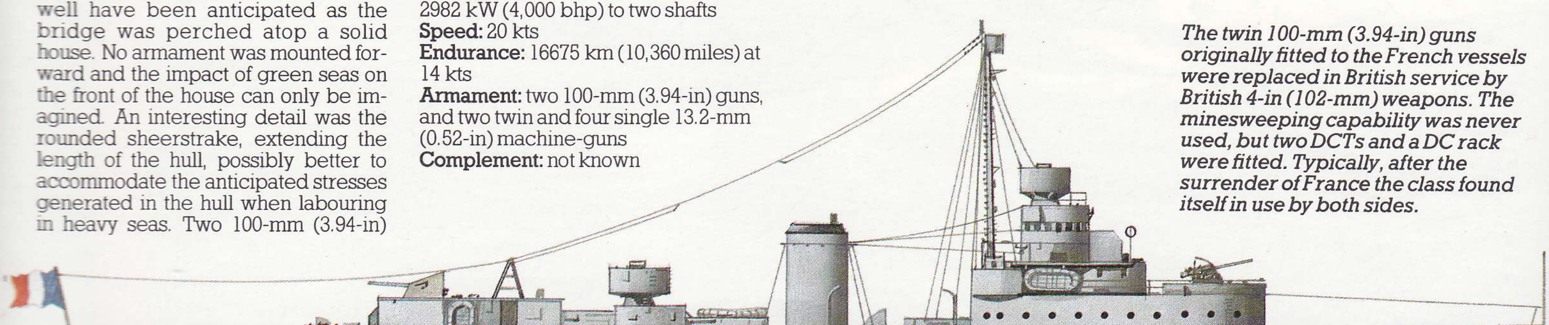
Where ships are concerned it is often said that 'if it looks right, it is right'. The converse apparently holds good, for a follow-on series of nine **'Chamois' class** ships, whose entry into service was disrupted by the war, virtually repeated the design but incorporated a raised forecastle and looked altogether more workmanlike. Their careers were typically complex with, for instance, ***l'Impetueuse*** being scuttled by the French at Toulon, only to be salvaged by the Italians and then, at their capitulation, being taken in turn by the Germans who, finally, scuttled her again at Marseilles. Another three units were war losses.

Specification

'Elan' class (as built)
Displacement: 630 tons standard and 740 tons full load
Dimensions: length 78.0 m (255.9 ft); beam 8.5 m (27.9 ft); draught 2.4 m (7.9 ft)
Propulsion: two diesels delivering 2982 kW (4,000 bhp) to two shafts
Speed: 20 kts
Endurance: 16675 km (10,360 miles) at 14 kts
Armament: two 100-mm (3.94-in) guns, and two twin and four single 13.2-mm (0.52-in) machine-guns
Complement: not known



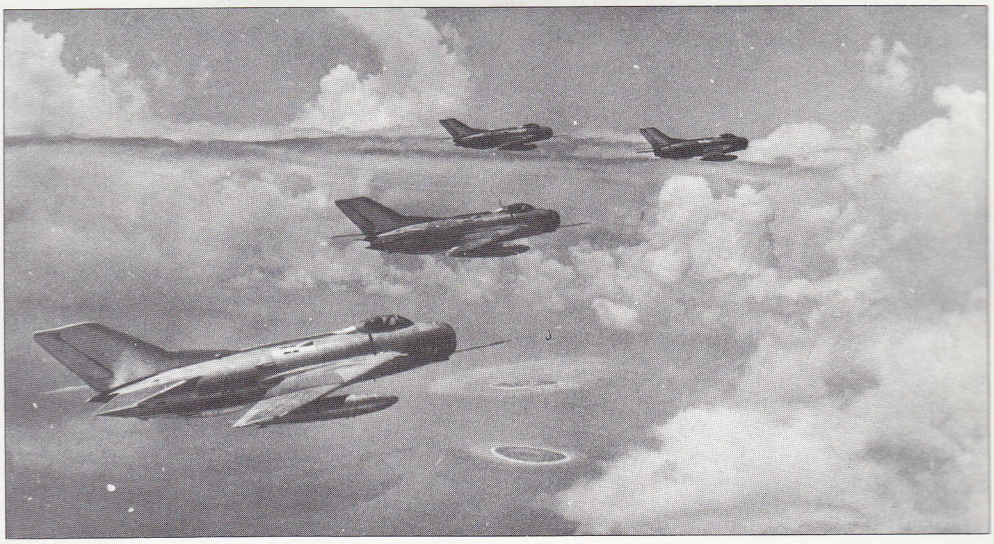
The early 'Elan' class vessels were notable for their unusual appearance; with no armament on their distinctive low foredeck and the rounded sheerstrake continuing the length of the hull, from some angles the Elans bore a resemblance to a top-heavy submarine.



The twin 100-mm (3.94-in) guns originally fitted to the French vessels were replaced in British service by British 4-in (102-mm) weapons. The minesweeping capability was never used, but two DCTs and a DC rack were fitted. Typically, after the surrender of France the class found itself in use by both sides.

China

Part 3



China has the world's third largest air force, but her aircraft are now mainly obsolescent types. These J-6s, part of a Naval Fighter Division, are Chinese-built MiG-19s that entered service with the Chinese air force 23 years ago.

The Chinese Air Force

China has numerically the third largest air force in the world after the USSR and the USA, but obsolete equipment and organizational problems seriously undermine its effectiveness.

The Air Force of the People's Liberation Army (AFPLA) has been an integral part of China's military structure since its foundation in 1946 during the Chinese Civil War. Initially equipped with captured Japanese and Soviet-donated aircraft, the AFPLA added American types to its inventory when the Nationalists finally withdrew to Formosa in 1949, leaving much equipment on the mainland. The AFPLA was first to make real impact when it brought newly-supplied Mikoyan-Gurevich MiG-15 fighters to bear on the Korean War in 1950 after minimal training. The Soviet Union had helped in the establishment of flying training schools in Manchuria, in the supply of equipment, and in developing an aircraft industry, also in Manchuria at Shenyang (Mukden) and Pinkiang (Harbin).

The organization of the air force also follows Soviet lines; the largest cohesive unit is the division, comprising three regiments (roughly equivalent to a wing), each regiment being composed of three flying brigades (squadrons) of four sections (flights). The divisions employ a mixed range of aircraft fulfilling a variety of tasks, although one function (often air defence) normally predominates. Thus the 38th Air Defence Division, tasked with the defence of Beijing (Peking), has two regiments to the south at Yangtsuon and one at Changping north of the capital. The main equipment is the J-6 and J-6C day fighter, though some sections fly the JZ-6 reconnaissance version. The regiments also employ the J-5 and JJ-5 trainer and elderly Y-5 transports. At regiment level one brigade is confined to maintenance, and with few covered facilities (even at major air bases) serviceability is low despite the relative simplicity of the aircraft. The division's nominal strength is 120 aircraft.

After her experience gained over Korea, where up to three divisions were committed, China sought to build up her own aircraft industry based on the licence production of Soviet types. The first BT-5 (Yakovlev Yak-18) flew at Shenyang in 1954, followed by the J-5 (MiG-17PF) and J-2 (MiG-15UTI) in 1956 and the Y-5 (Antonov An-2) in 1957. A licence to produce the MiG-19 as the J-6 was signed in 1958, the first aircraft flying at Beijing in December 1961.

The AFPLA had fared badly at the hands of the Nationalist air force over the Straits of Formosa in 1958, and with increasing intrusions over the mainland from Formosan bases, more advanced aircraft were needed. But relationships between China and the Soviet Union soured, and in 1960 all Soviet aid was withdrawn. By this time some MiG-21s (J-7) had been supplied, but no production lines had been established. The Chinese might have weathered the Soviet withdrawal and developed a free-standing technologically-advanced industry had it not been for the cultural revolution. From 1966 to 1977 political fervour disrupted every aspect of life, but most importantly any notion of structure or formal organization was swept away. Advancement of the individual was based not on age, merit or experience but upon political strength, so activists secured key positions. If the air force survived this period, during which ranks disappeared, the aircraft industry did not; fanaticism is no substitute for planning and order. Attempts have been made to develop indigenous types, based broadly upon Soviet designs, but the obsolescent J-6 remains the most widely used aircraft.

The AFPLA deploys 3,200 fighters and 450 light bombers (12 regiments) in 27 air divisions. The balance of types is believed to be:

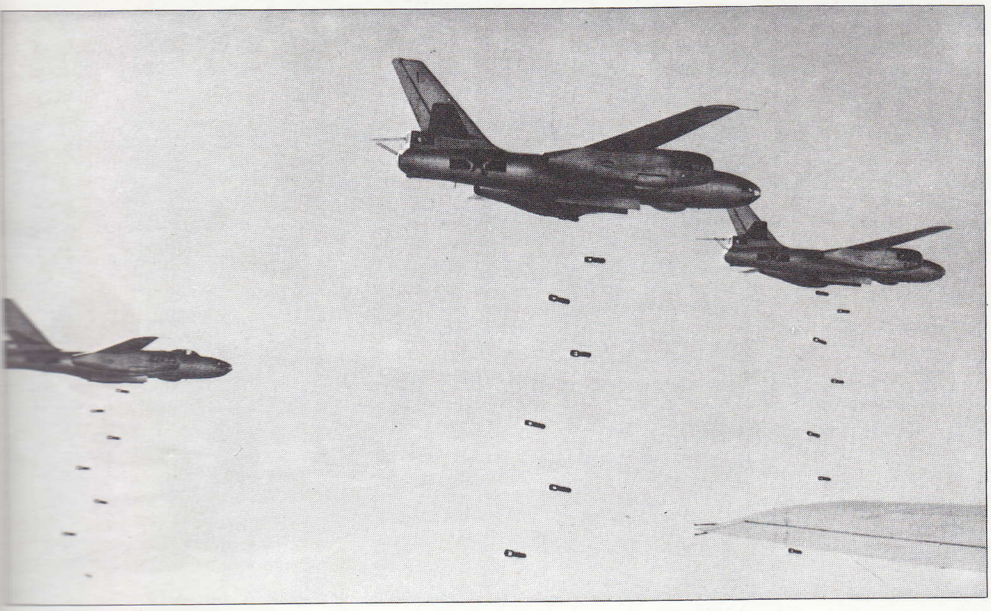
A-5 'Fantan' (local MiG-19 variant)	225
B-5 (Il-28)	450
J-4 (MiG-17F)	330
J-5 (MiG-17PF)	340
J-6 (MiG-19)	1950
J-7 (MiG-21)	210
J-8 'Finback' (local MiG-21 variant)	130

In addition four regiments of 90 B-6 (Tupolev Tu-16) bombers are based in Sinkiang confronting the Soviet Union. About 50 Tu-4 (B-29 copies) are still in service. In support is a mixed transport fleet comprising:

Y-5 (An-2)	250
Y-7 (An-24)	17
Y-8 (An-12)	12
An-26	10
Ilyushin Il-18	7
Il-14	36
Lisunov Li-2 (C-47 copy)	72
Curtiss C-46	20
BAe Trident	18
Douglas DC-6	5

Most of the Il-14s and Li-2s are stationed in Wuhan province supporting the three independent airborne divisions based there. In addition there are 115 JC-6 reconnaissance fighters, 250 advanced trainer variants of fighter types, and about 3,500 trainers of the BT-5 (Yak-18) type, including the locally designed development, the BT-6. Manpower strength is some 490,000, though this figure includes the personnel of the strategic forces and air-defence forces (220,000).

There is no separate army aviation, but the air



Some 12 air regiments are equipped with the H-5 twin-jet light bomber, the Chinese version of the Soviet Il-28. Normal and maximum bomb loads are 1000 kg (2,205 lb) and 3000 kg (6,614 lb) respectively, and a number of H-5s are believed to be configured to carry nuclear weapons.

force operates 340 H-5 (Mil Mi-4), 50 H-9 (Aérospatiale Dauphin) and 15 Mi-8 helicopters.

Naval aviation, previously discussed, is separately organized with light bomber/torpedo aircraft (200 B-5 and 50 B-6) in three 'divisions' at Hulin, Amoy and Tsingtao. Fighters are shore-based and incorporated into the basic air-defence system as six 'divisions'. These comprise 200 J-5, 300 J-6 and 50 J-7 aircraft. Twenty Beriev Be-6 seaplanes are used for ASW work, and helicopters include 40 H-5s and 13 Aérospatiale Super Frelons. Transport aircraft operated by the navy include 20 Li-2s and 40 of the ubiquitous Y-5. Personnel amount to some 38,000.

The major problem for the AFPLA is its ageing equipment. China lacks the currency to buy abroad and possibly the expertise necessary to handle modern technically-complex aircraft production on a large scale. Selection of designs for licence production and development is therefore critical. A further problem remains one of organization. Operations against the North Vietnamese in 1979 highlighted the absence of air/ground co-ordination and the lack of appropriate communications systems. Sheer weight of numbers alone is not enough to support systematic military action.

China includes 11 military regions (MR) based on groupings of provinces, in themselves military districts (MD). Air units are believed to be disposed as set out below.

Right: The Q-5 is a Chinese development of the J-6, with twin lateral intakes replacing the single divided nose intake and a fuselage about 25 per cent longer. The extra space was to have been used for an internal weapons bay, but is now used to increase fuel capacity by 70 per cent.

Order of Battle

Area	Military regions and subordinate military districts	Strength and location
North East China	**Shenyang MR**	
	Heilongjiang MD	2 divs (Pinkiang, Fuchin)
	Jirin (Kirin) MD	1 div (Kirin)
	Liaoning MD	2 divs (Shenyang, Liaoyang) 2 NFDs (Dairen, Chinhsien)
	(most basic training is organized in Shenyang MR)	
	Beijing (Peking) MR	
	Nei Monggol MD	1 div (Kweisul)
	Hebei (Hopeh) MD	2 divs (Tientsin, Paoting)
	Shanxi (Shansi) MD	2 divs (Taiynan, Wanchuan)
South East China	**Jinan (Tsinan) MR**	
	Shandong MD	1 div (Tsinan) 1 NFD (Chefoo) 1 NBD (Tsingtao)
	Nanjing (Nanking) MR	
	Kiangshu MD	1 div (Nanking) 1 NFD (Shanghai)
	Zheijiang (Chekiang) MD	1 div (Kinhwa)
	Fuzhou (Fuchow) MR	
	Fujian (Fukien) MD	2 divs (Tsingkiang, Minhow) 1 NFD (Amoy) 1 NBD (Amoy)
	Jiangxi (Kiansi) MD	1 div (Nanchang)
	Wuhan MR	
	Henan (Honan) MD	1 div (Kaifeng)
	Hubei (Hopeh) MD	TG (Hankow)
South West China	**Guangzhou (Kuangchow) MR**	
	Guangdong (Kwangtun) MD	1 div (Canton) 1 NFD (Swatow)
	Hinan (Hunan) MD	1 div (Kweilin)
	Hainan MD	1 div (Haikon) 1 NBD (Hulin)
	Guanxi (Kwangsi) MD	1 div (Nanning)
	Kunming MR	
	Yunnan MD	1 div (Kunming)
	Chengdu (Chengtu) MR	
	Sichuan (Szechwan) MD	1 div (Chunking)
North West China	**Lanzhou (Lanchow) MR**	
	Gansu (Kanshu) MD	1 div (Suchow)
	Ningxia (Ningsia) MD	1 div (Ningsia)
	Urumqi (Urumchi) MR	
	East Xinjiang (Singkiang) MD	1 div (Qomul) 1 BD (Lop Nor)
	North Xinjiang (Singkiang) MD	1 div (Urumchi)

Abbreviations

MR	Military Region
MD	Military District
Div	Mixed Air Division (120 aircraft)
NFD	Naval Fighter 'Division' (70 aircraft)
NBD	Naval Bomber 'Division' (40 aircraft)
BD	Bomber Division (4 regiments with 90 aircraft)
TG	Transport Group (100 aircraft)

The J-6 is armed with two or three NR-30 30-mm belt-fed cannon, depending on the model. One is situated in each wing root and the third, if present, under the starboard side of the nose. One or two weapons points are fitted inboard of each tank, and can mount packs of eight air-to-air rockets.